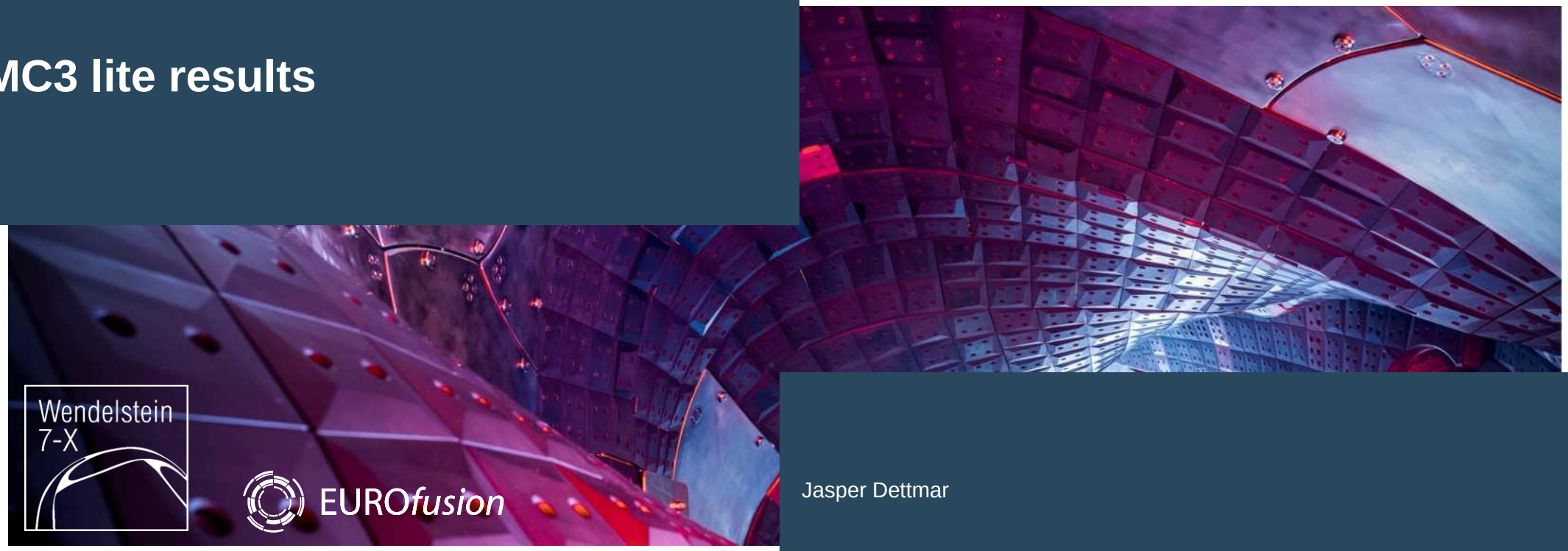
MAX-PLANCK-INSTITUT
FÜR PLASMAPHYSIK

EMC3 lite results



Jasper Dettmar

This work has been carried out within the framework of the EUROfusion Consortium, funded by the European Union via the Euratom Research and Training Programme (Grant Agreement No 101052200 — EUROfusion). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

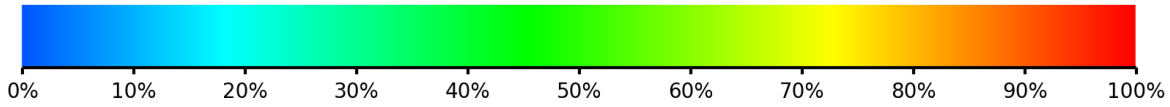
Geometry and simulation specifications

- **EMC3-lite was used for simulation, settings as follows:**

```
------------ Transport parameters ------------
PSOL(W)  ne_aver(cm**3) Te_aver(eV)  Chi(cm**2/s)
1.0000E+07  1.0000E+13  1.0000E+02  2.0000E+04
```

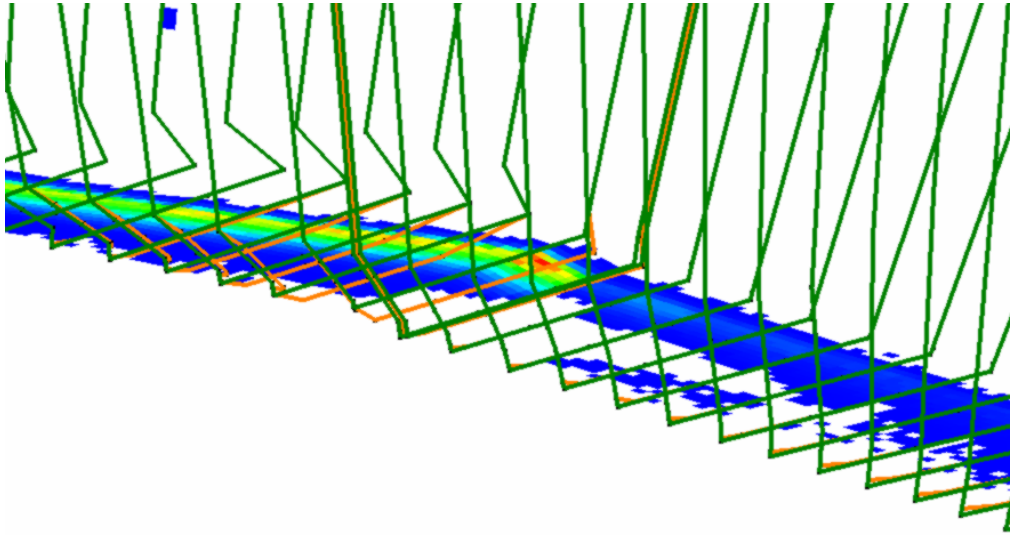
- **Number of particles used was 100 000, as samples with 1 000 000 particles brought very similar/ same results**

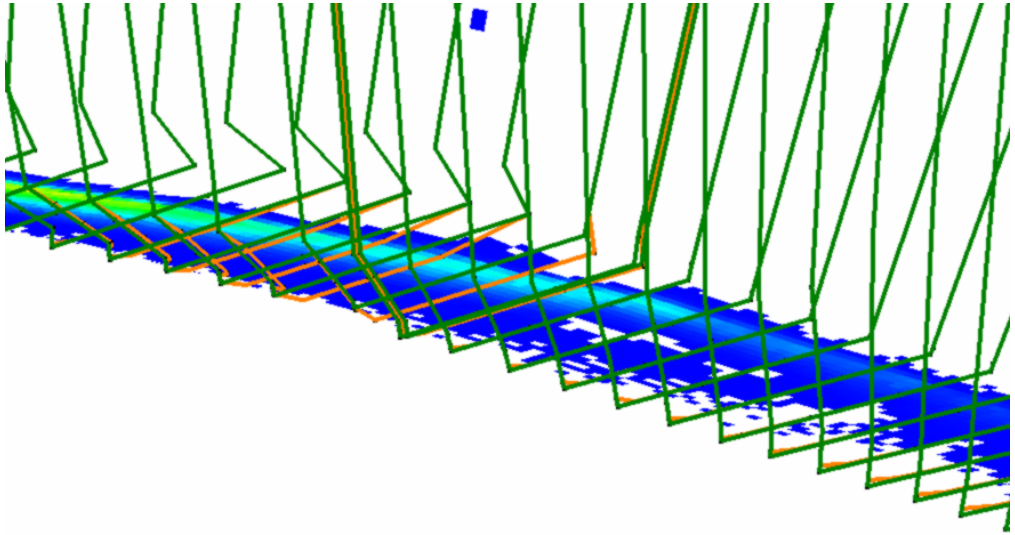
- **The colour-scale spans from 0 to 10 MW/m²:**



Geometry and simulation specifications

- To avoid hot spots and shadowing effects, a smoothened version of the current divertor-geometry was used
- Smoothend means that a few (3) leading edges or ripples were planed
- As an example, the TM6h/TM7h transition's original geometry (left) and planed geometry (right):





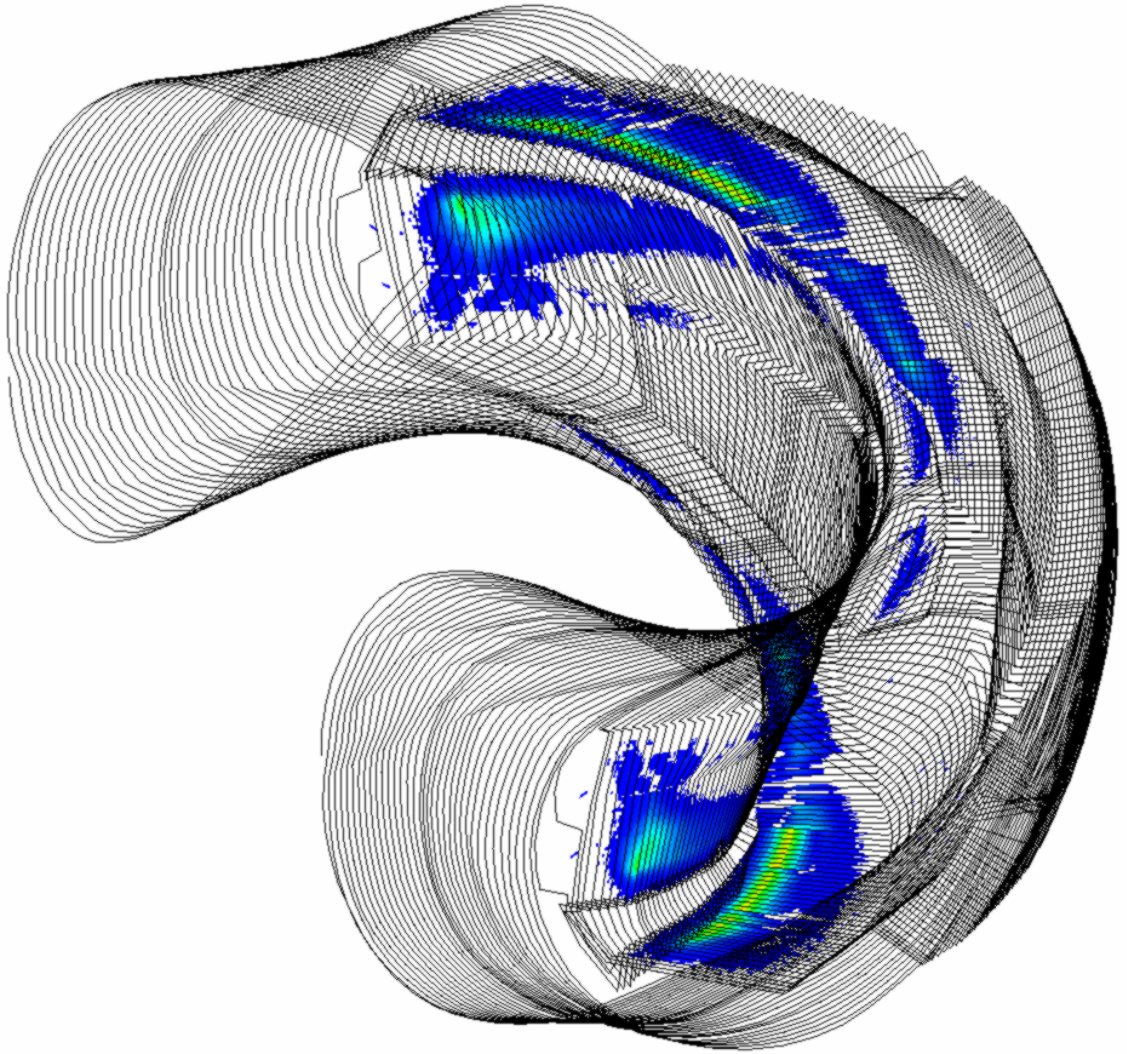
Changes in heat load pattern with Itor = 0 and varied beta

Standard, Itor = 0 kA: with increasing beta, loads on the vertical target develop into a strike line, while low heat loads spread over a larger area on the horizontal targets. For Beta >2,69 % a second strikeline appears on TMh. Loads appear on the outer baffle.

High Iota, Itor = 0 kA: Very little change. With increasing beta the strike line on TMh gets slightly narrower and heat loads concentrate on a smaller area.

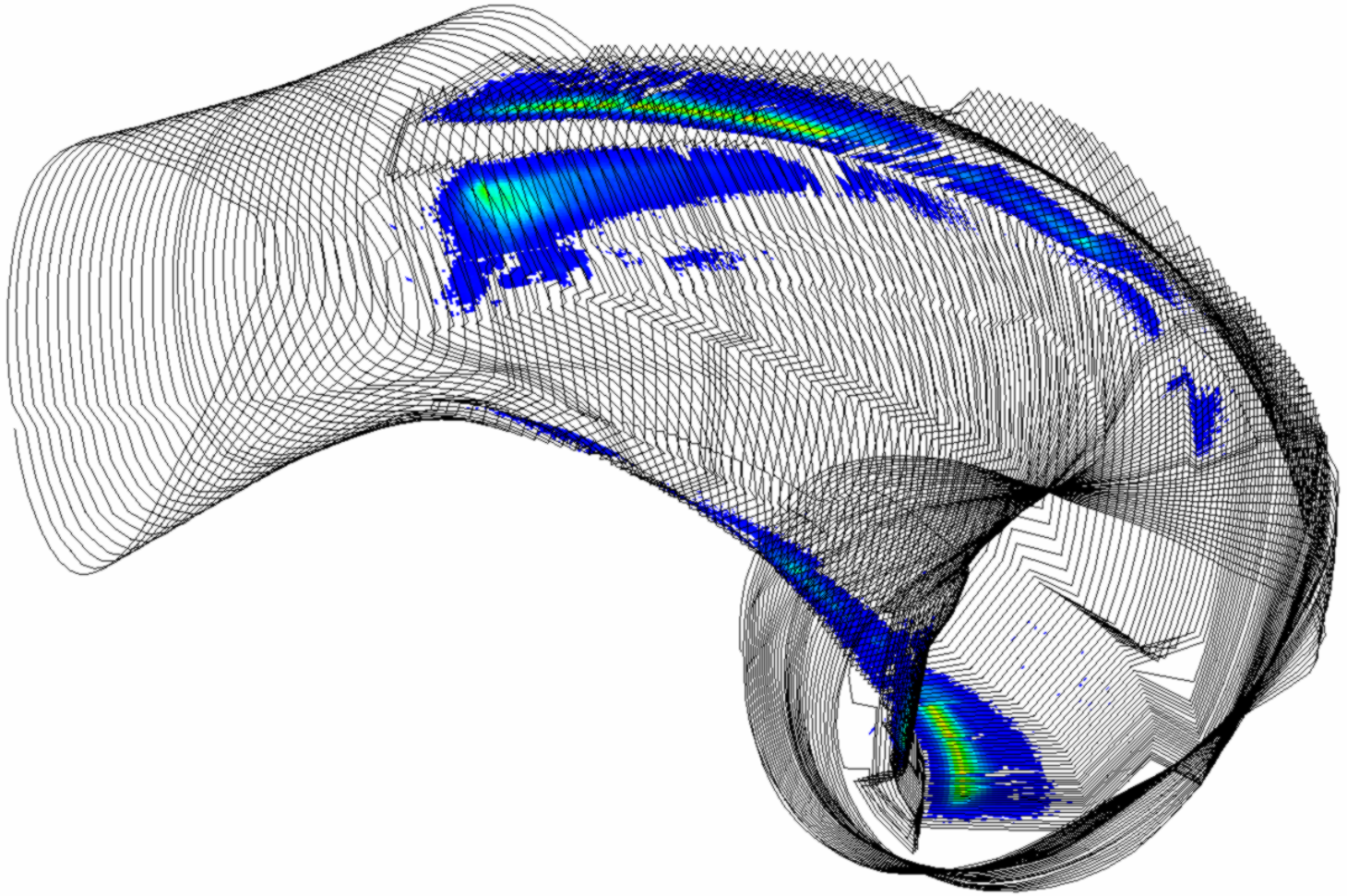
High Mirror, Itor = 0 kA: with increasing beta the strike line on TMv gets less pronounced and heat loads gradually move towards TMh. At Beta = 3 % a second, weakly pronounced strikeline appears on the outer half of TMh.

Originalgeometrie, Standard, Beta = 0 %, Itor = 0 kA



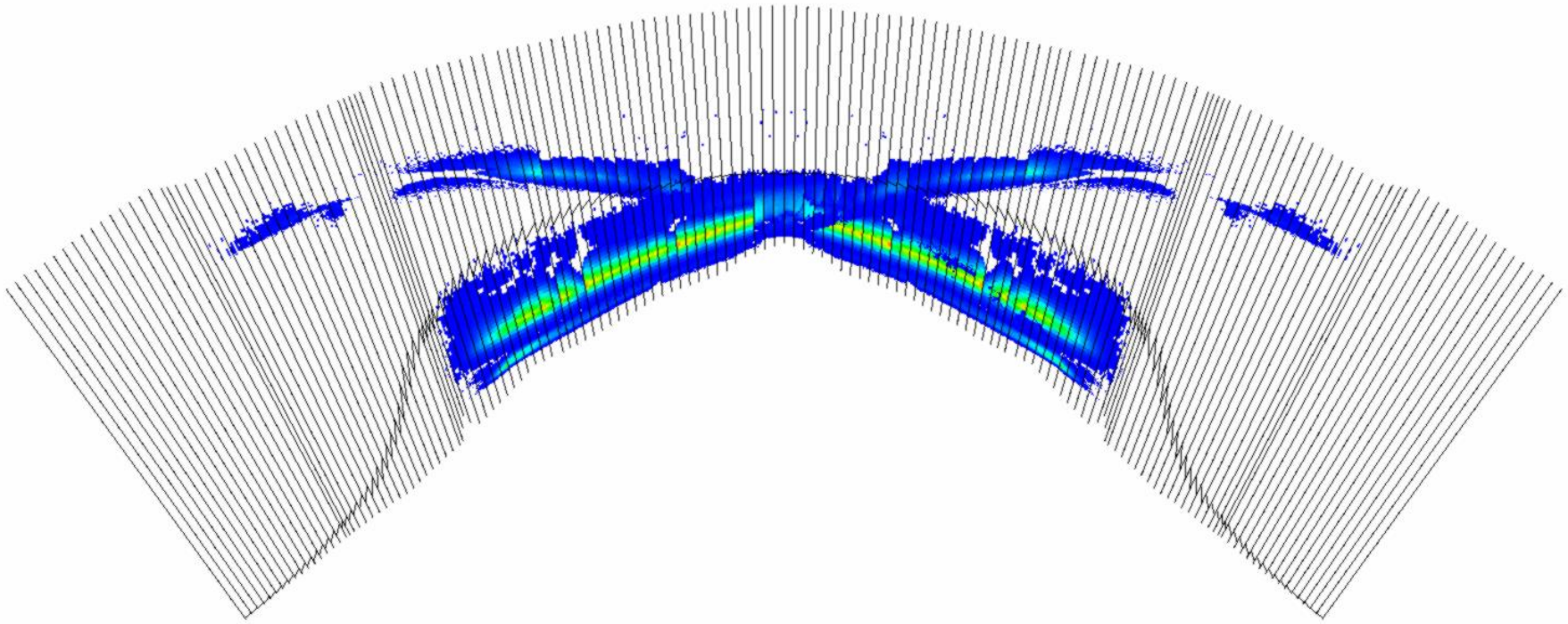
standard

Originalgeometrie, Standard, Beta = 0 %, Itor = 0 kA



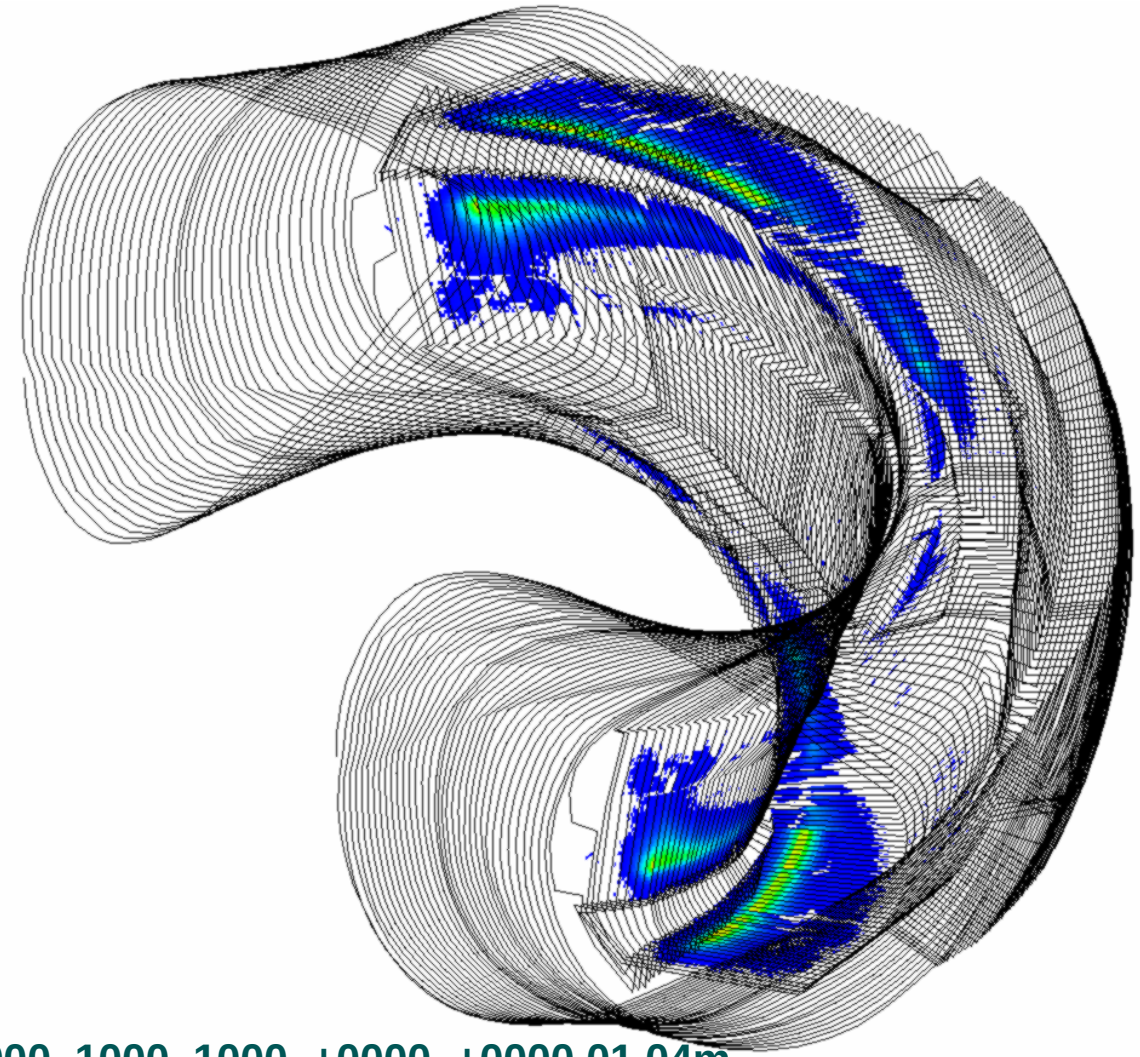
standard

Originalgeometrie, Standard, Beta = 0 %, Itor = 0 kA



standard

Originalgeometrie, Standard, Beta = 0,65 %, Itor = 0 kA



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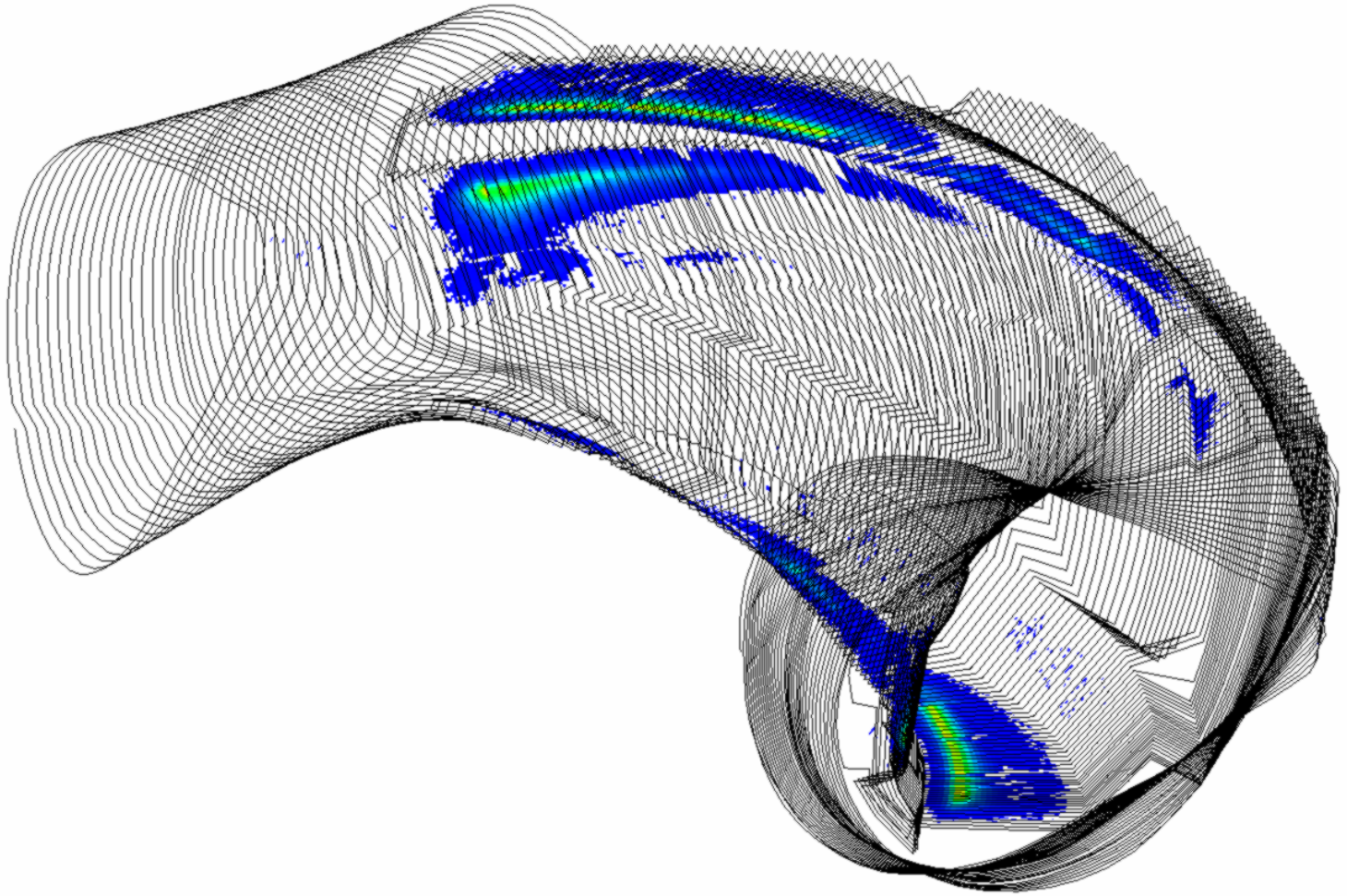
Originalgeometrie, Standard, Beta = 0,65 %, Itor = 0 kA



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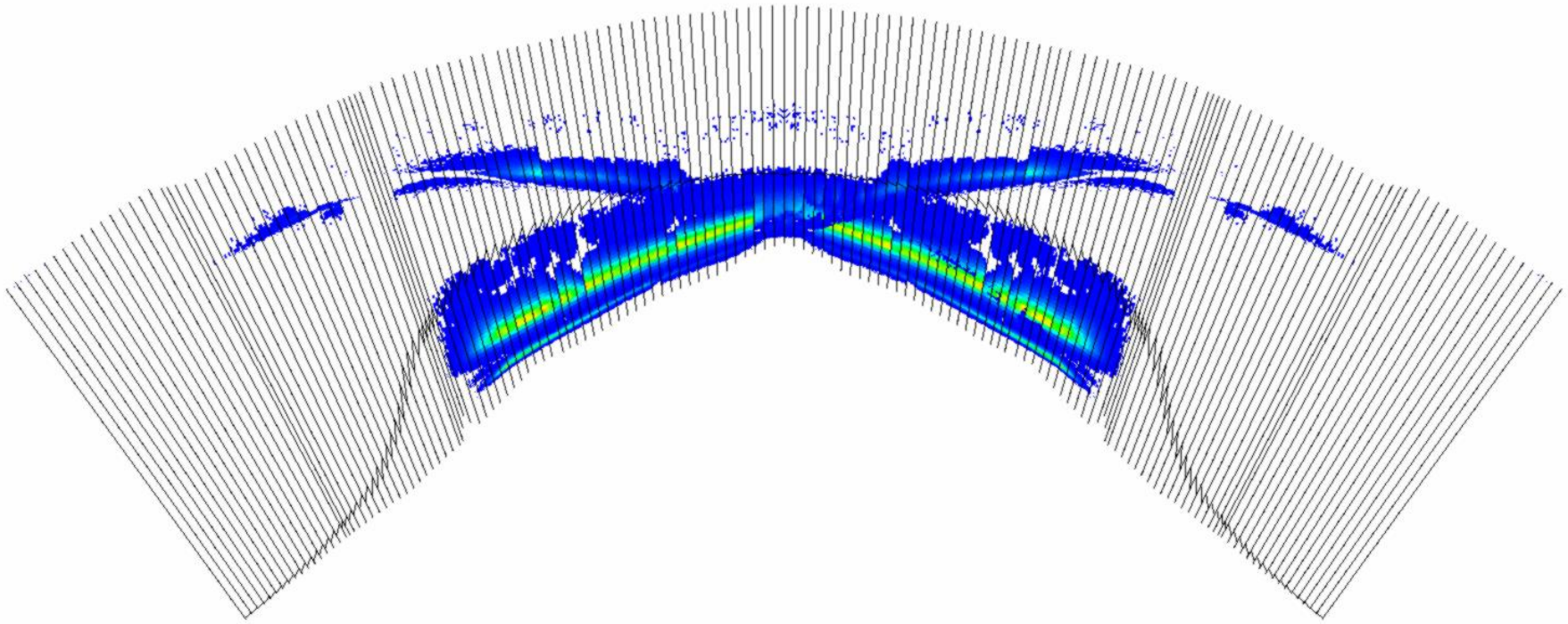
Originalgeometrie, Standard, Beta = 0,65 %, Itor = 0 kA



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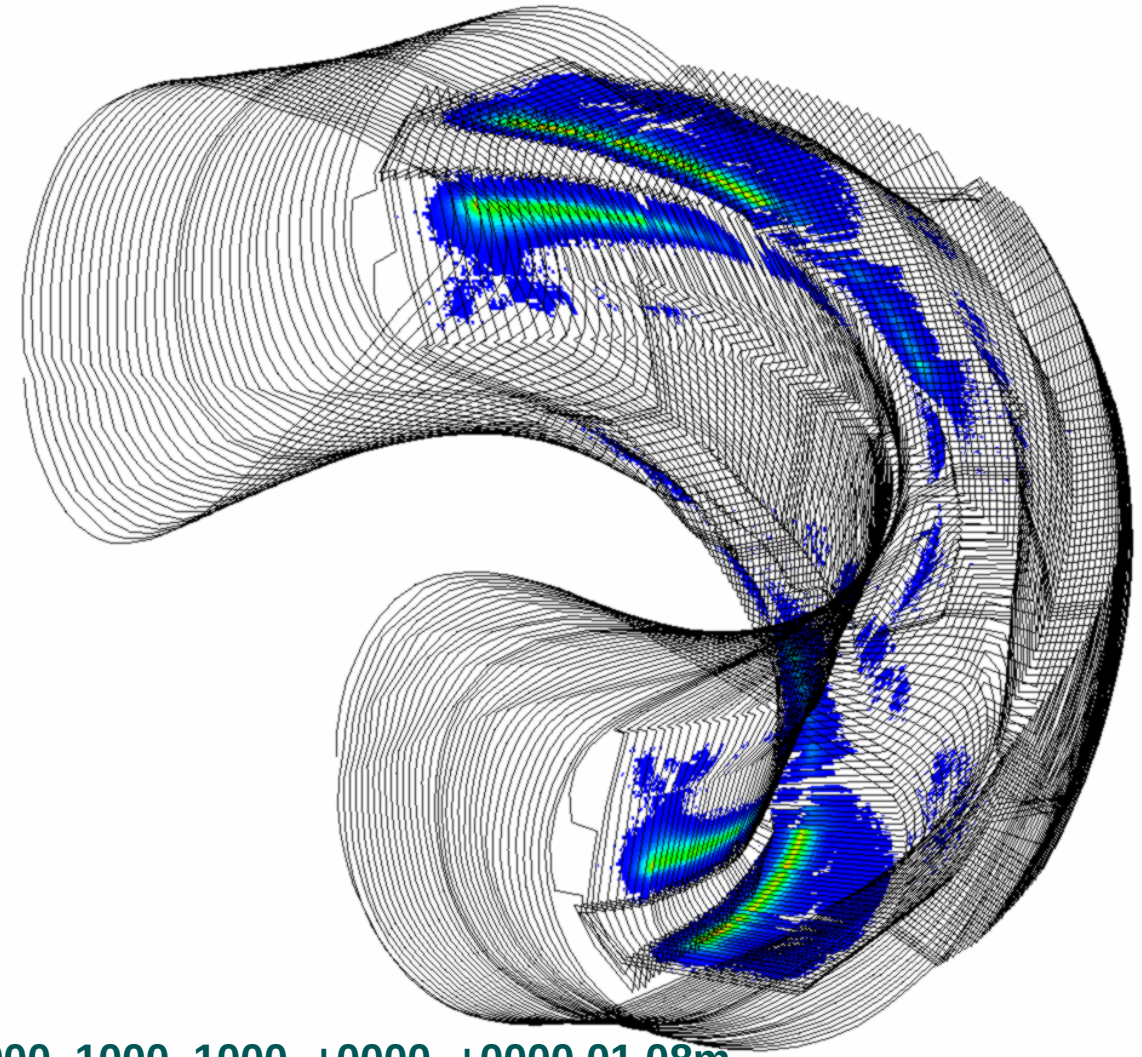
Originalgeometrie, Standard, Beta = 1,32 %, Itor = 0 kA



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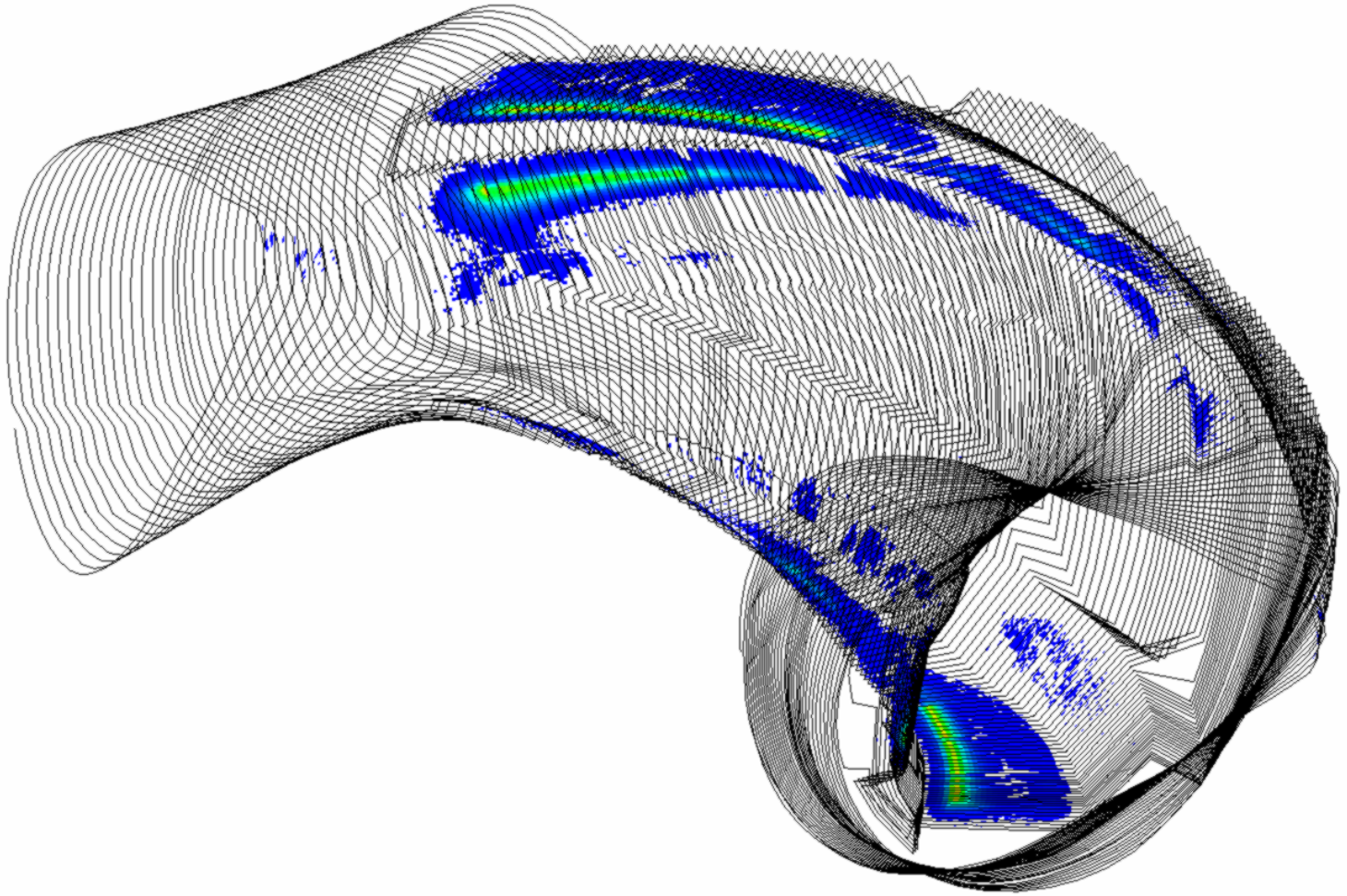
Originalgeometrie, Standard, Beta = 1,32 %, Itor = 0 kA



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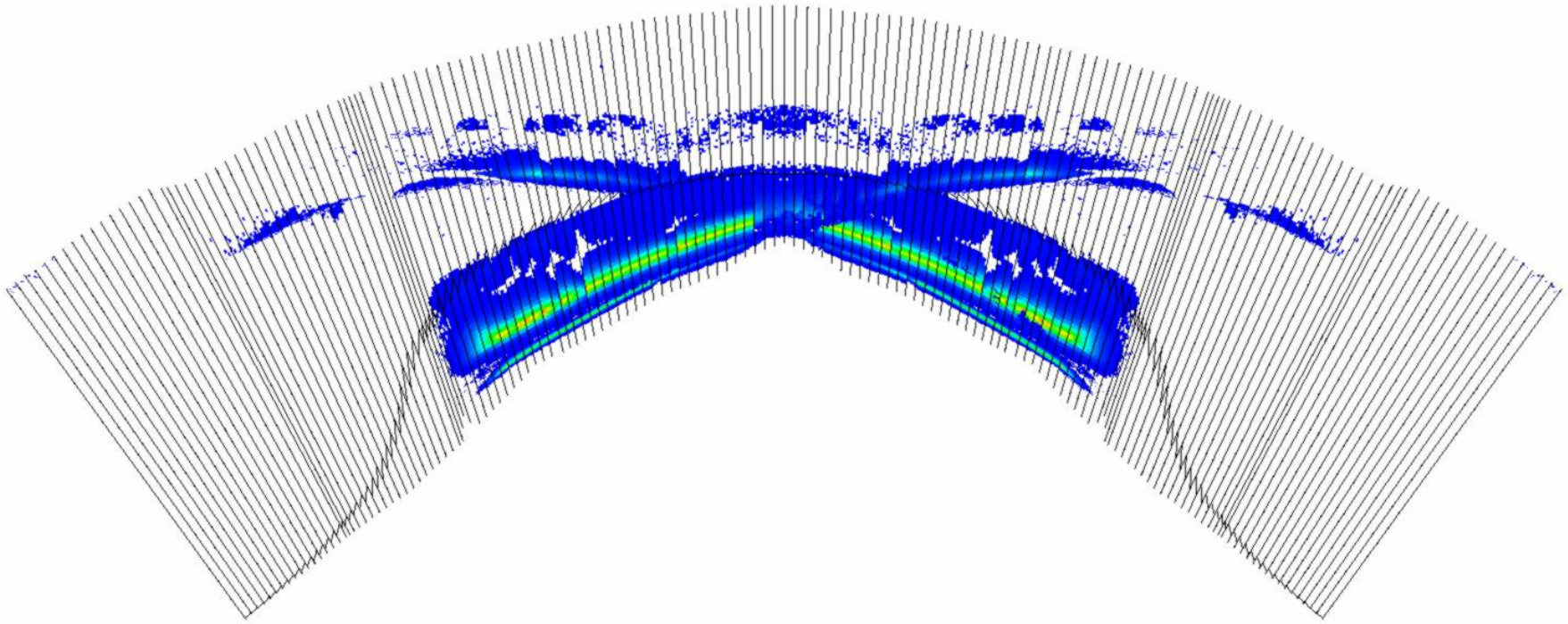
Originalgeometrie, Standard, Beta = 1,32 %, Itor = 0 kA



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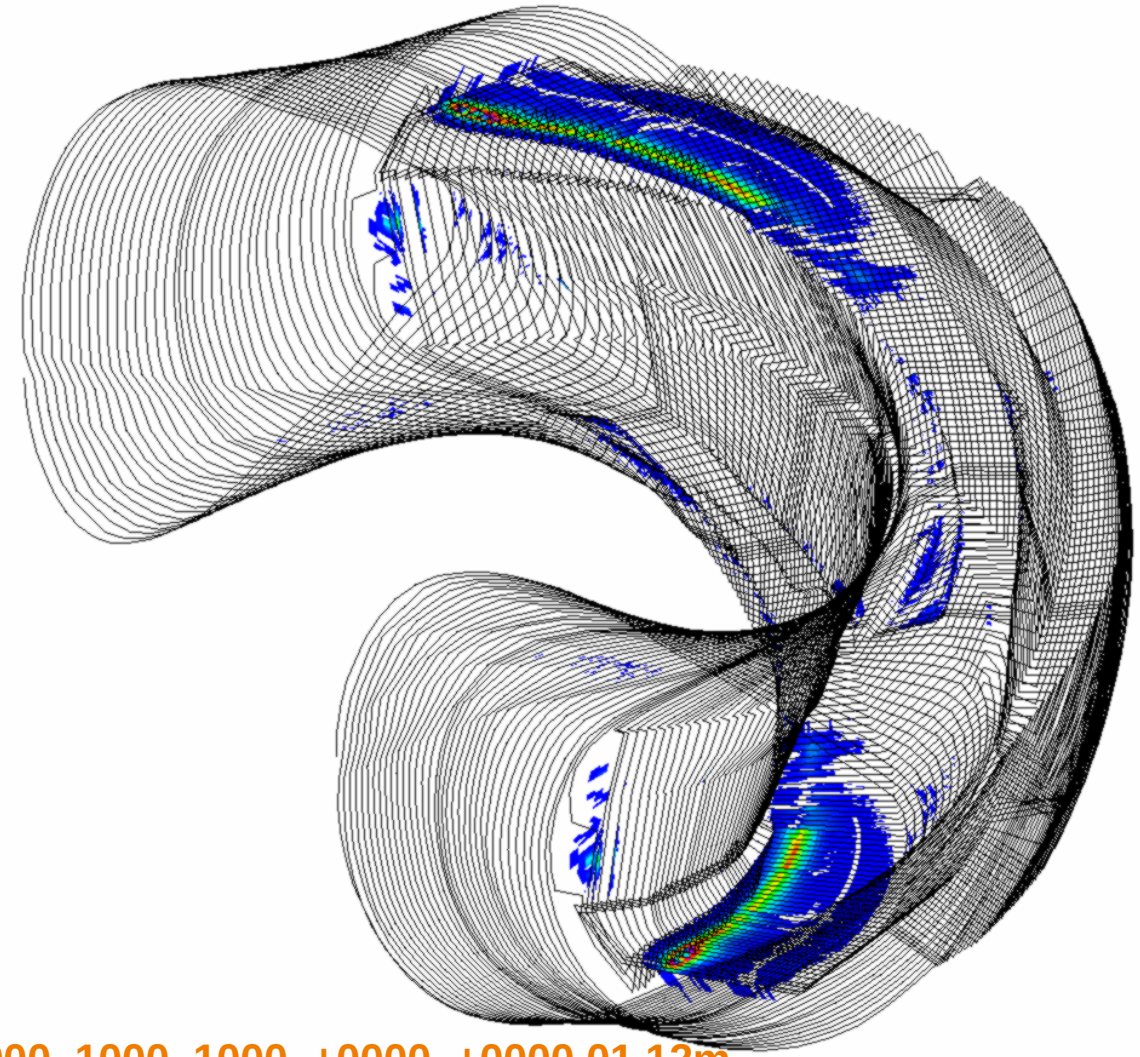
Originalgeometrie, Standard, Beta = 2,00 %, Itor = 0 kA (???)



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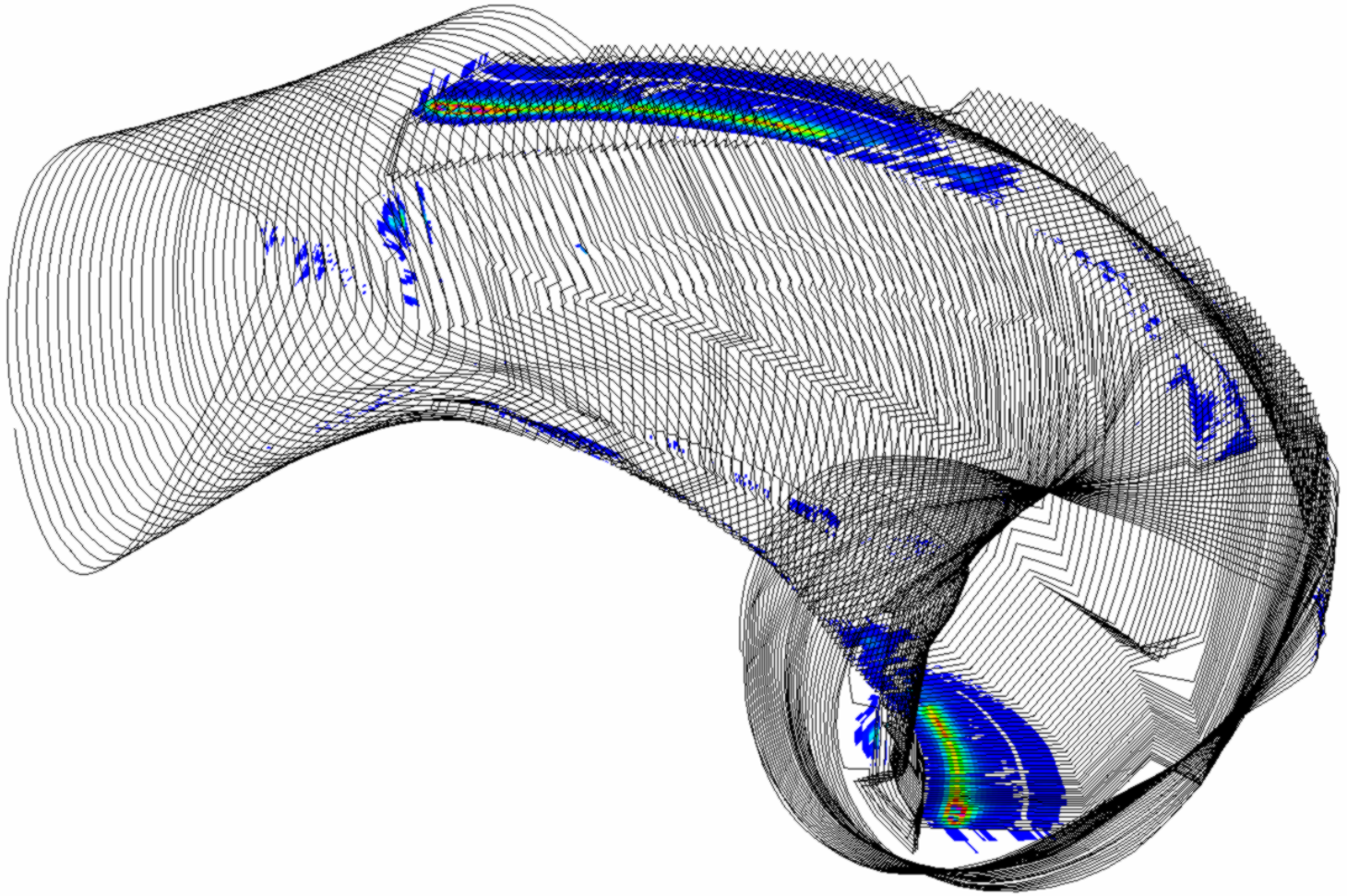
Originalgeometrie, Standard, Beta = 2,00 %, Itor = 0 kA (???)



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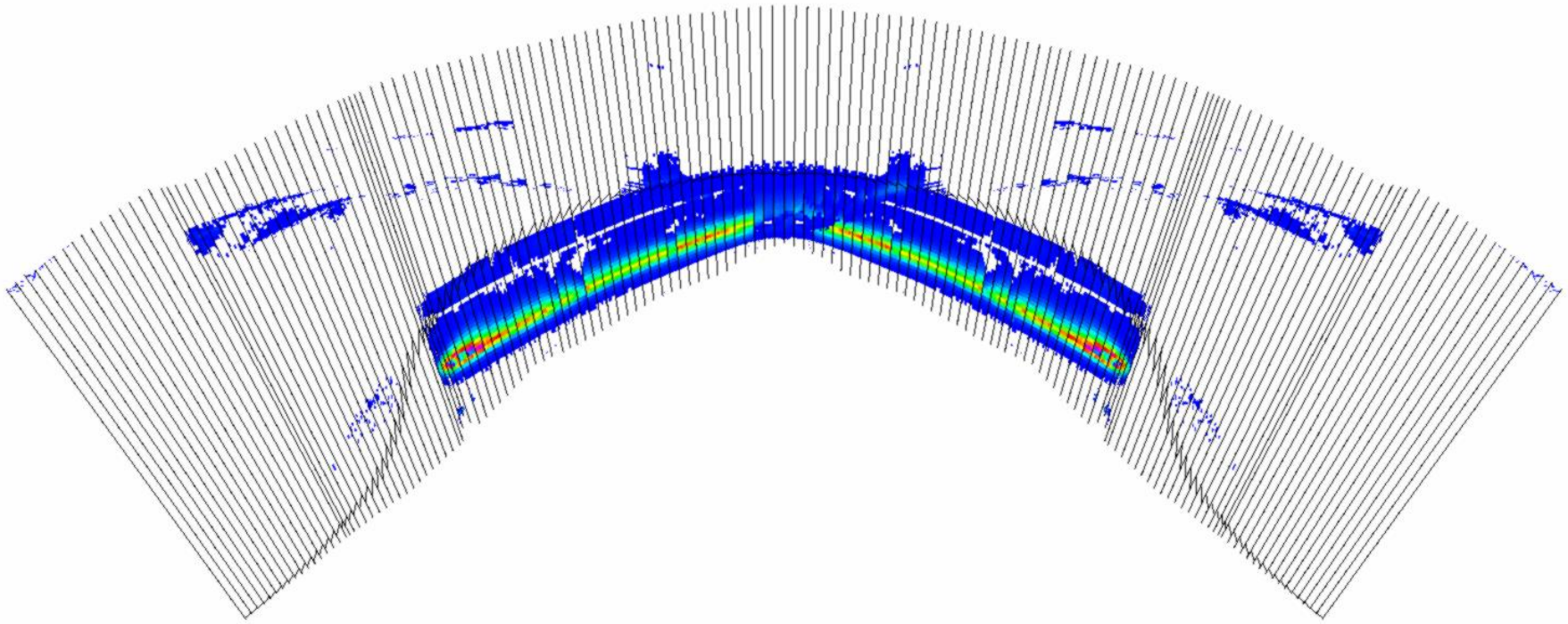
Originalgeometrie, Standard, Beta = 2,00 %, Itor = 0 kA (???)



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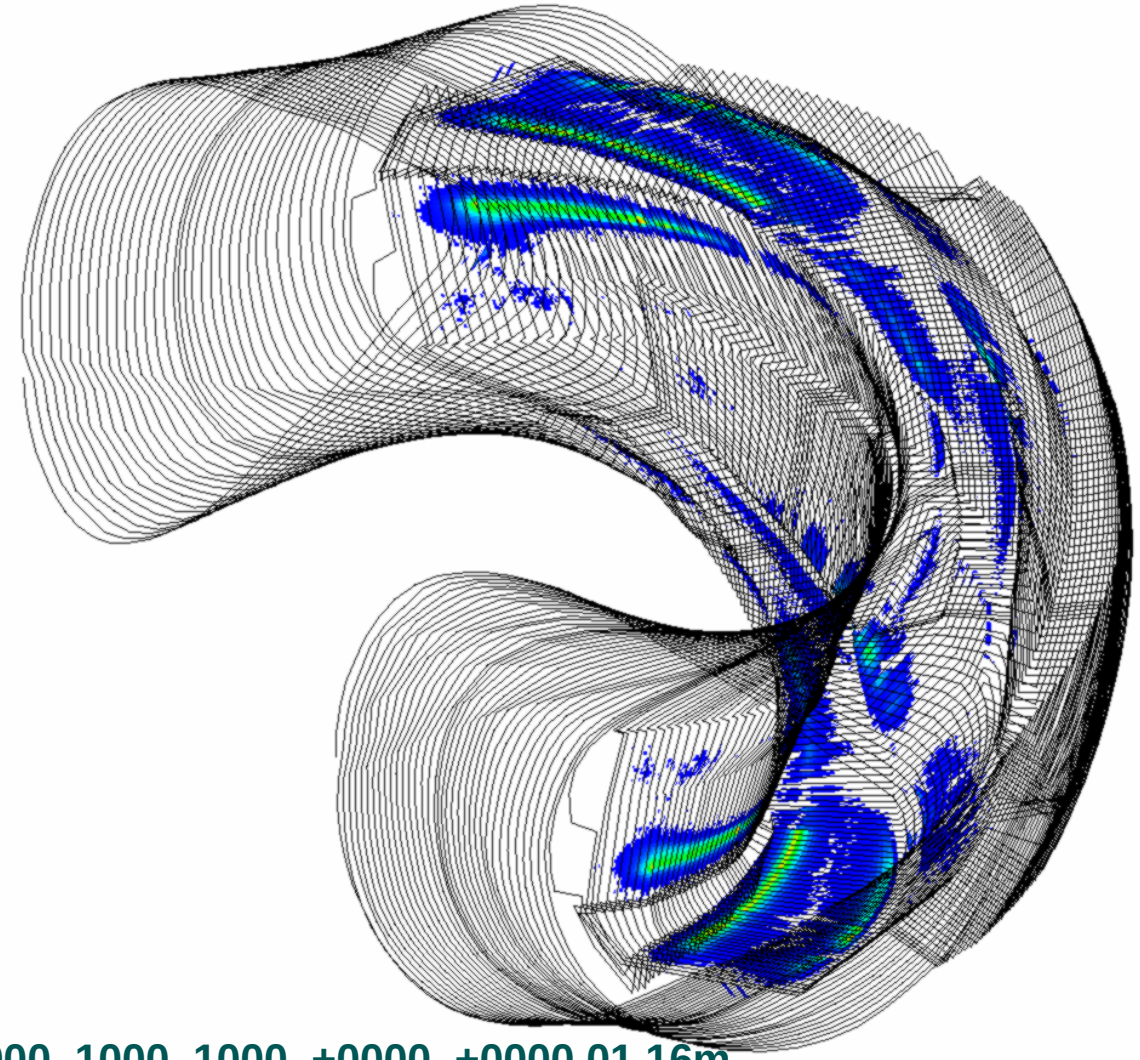
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 0 kA



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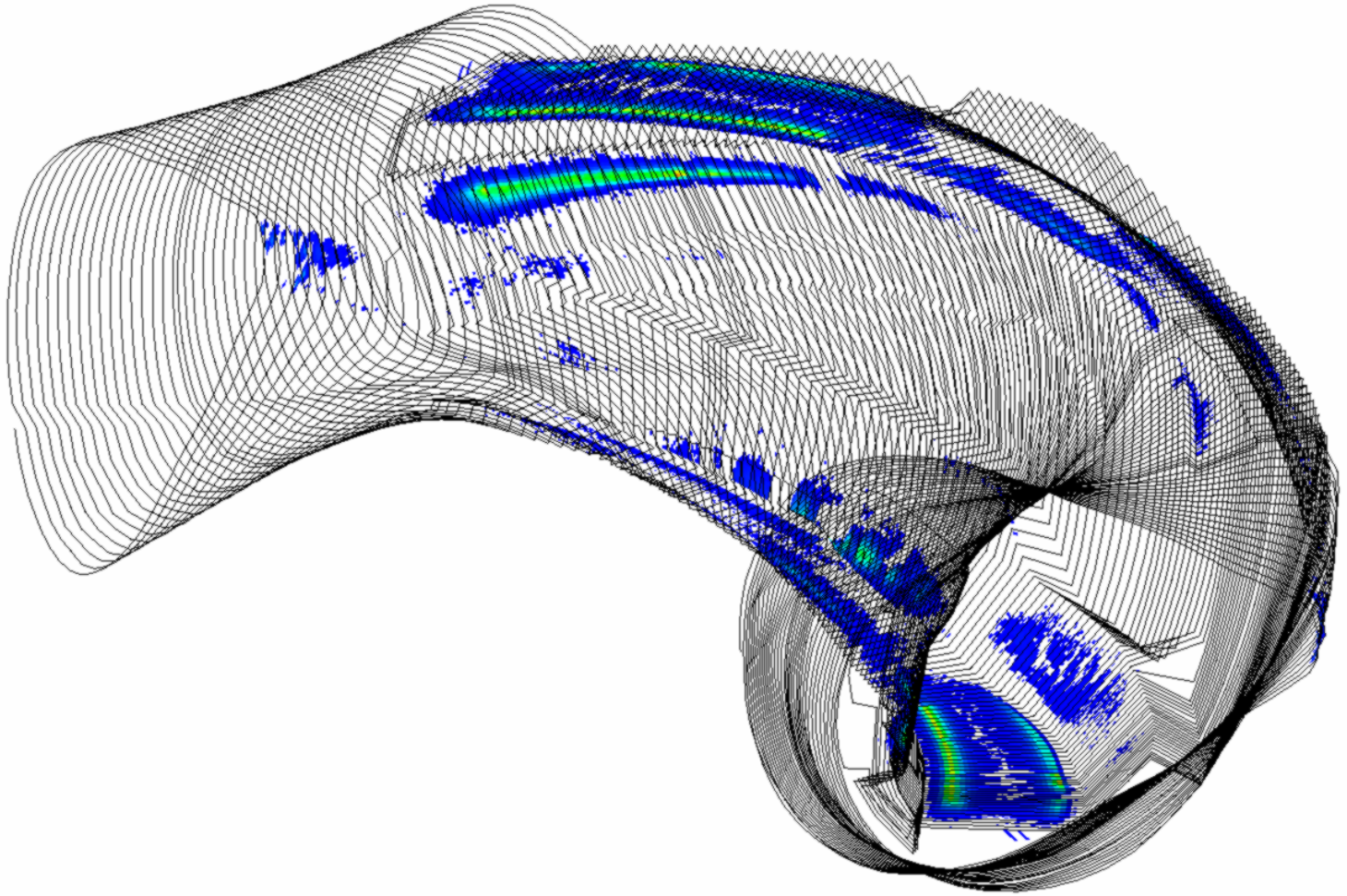
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 0 kA



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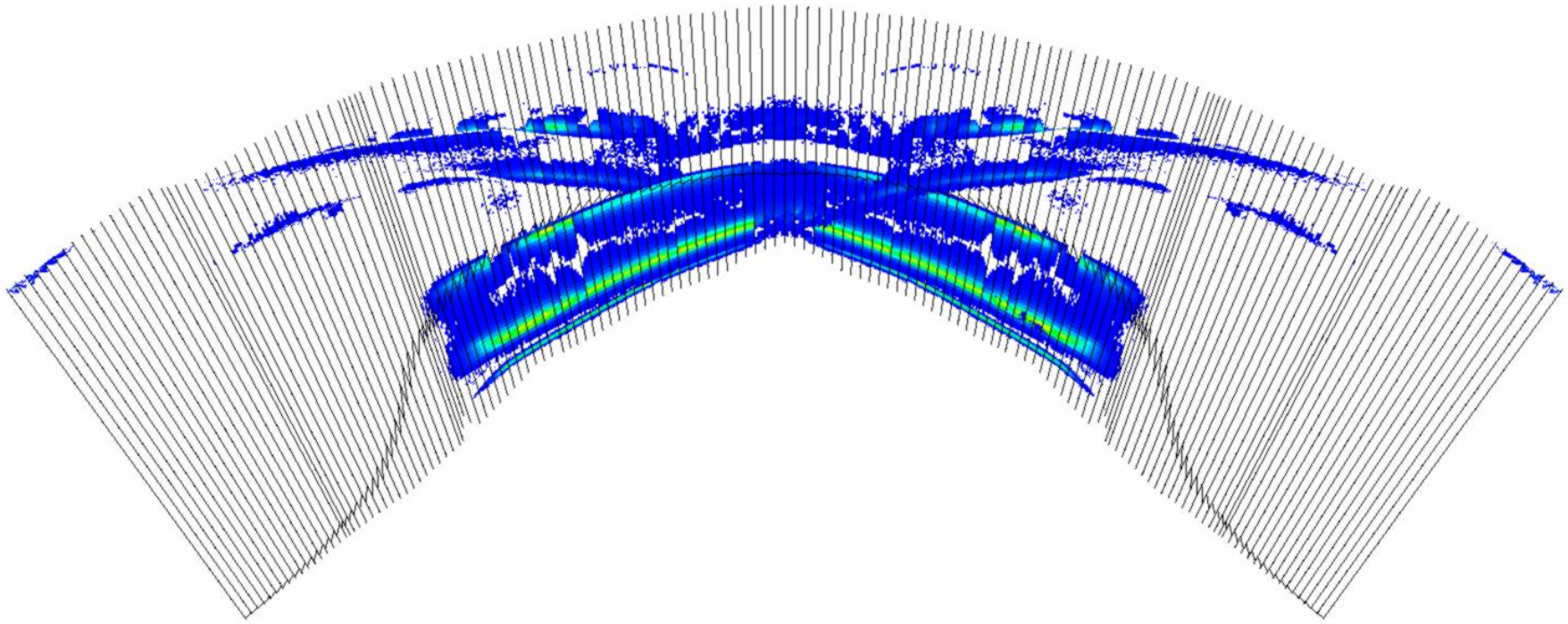
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 0 kA



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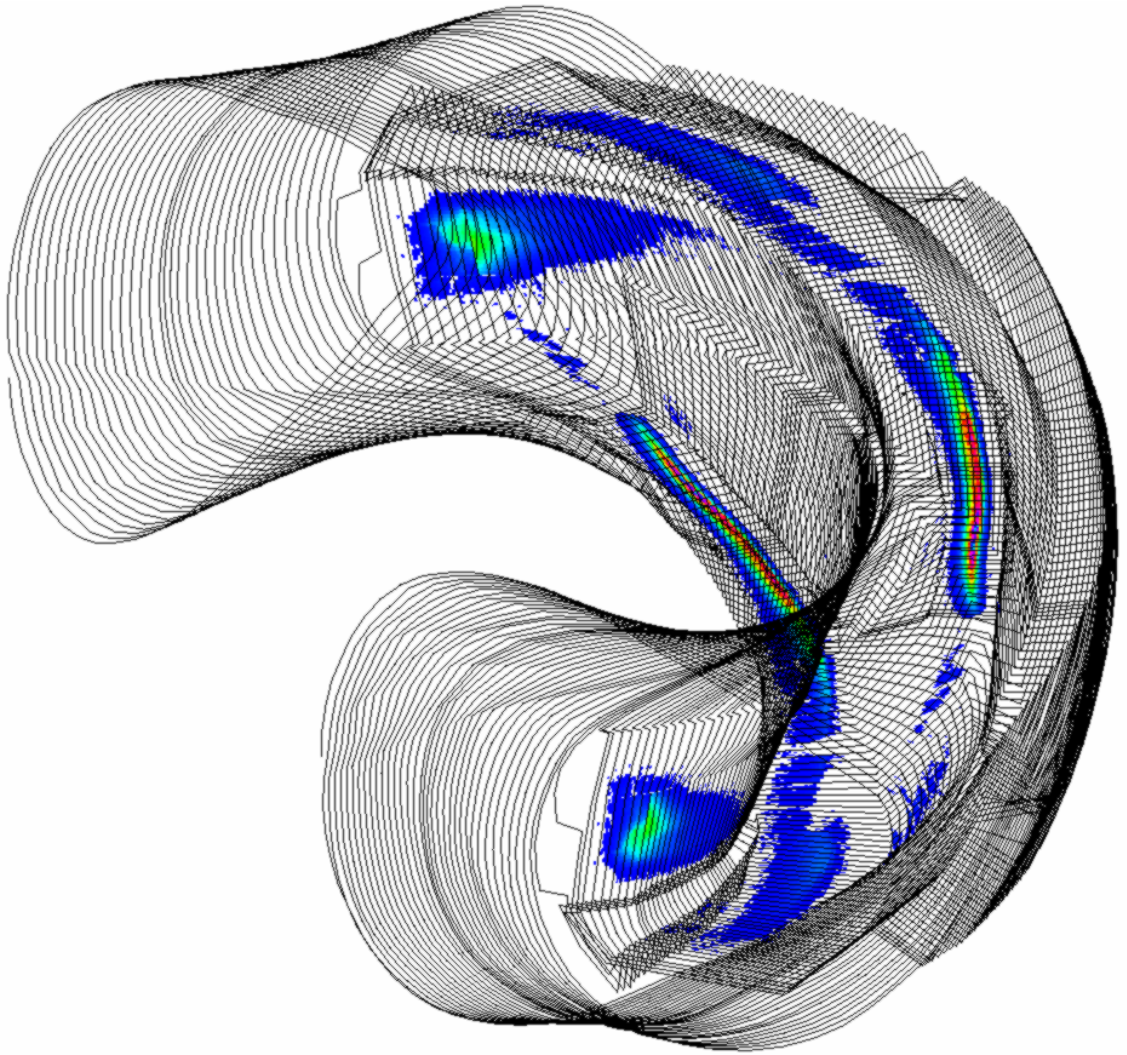
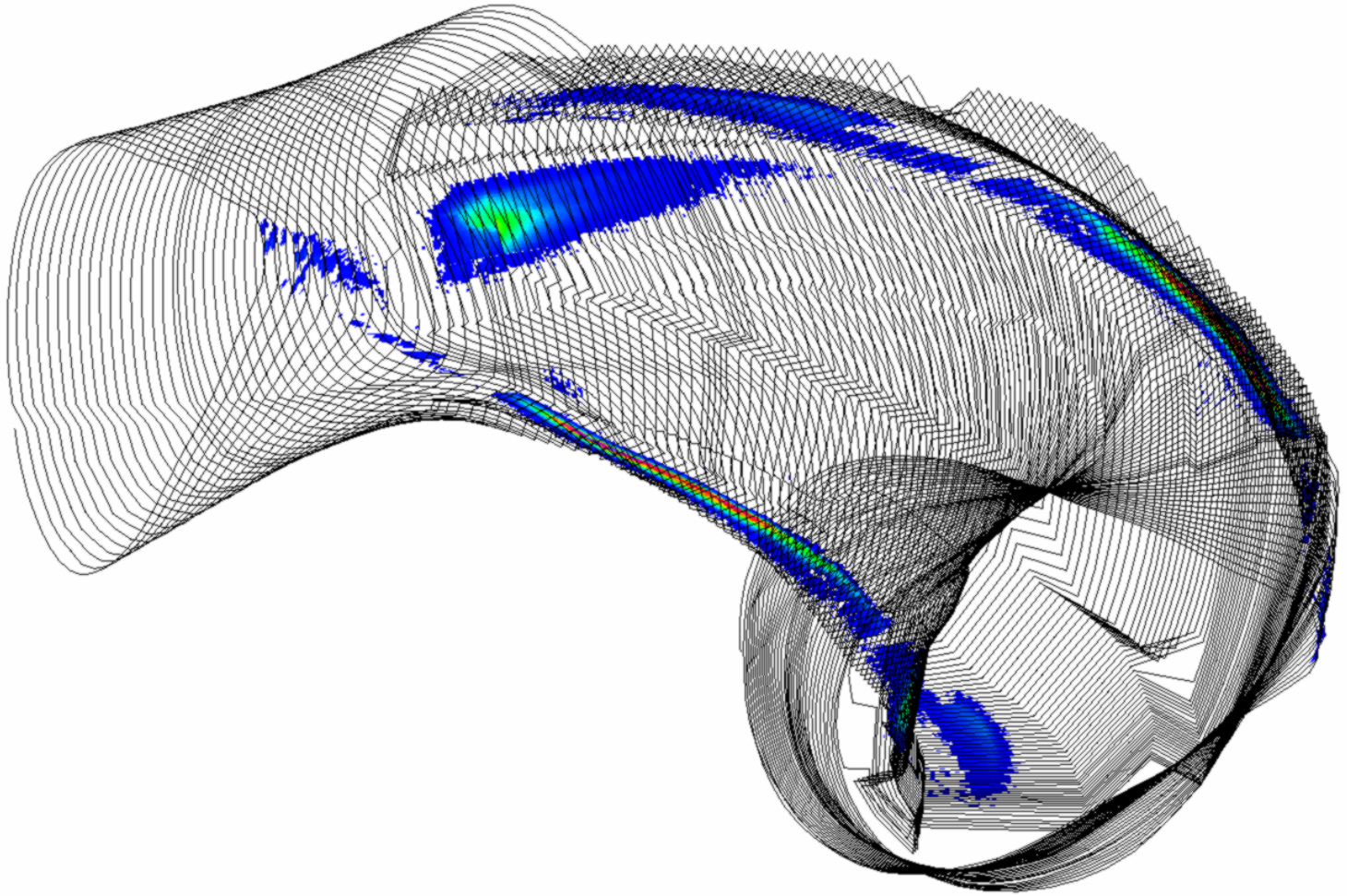
Originalgeometrie, High Iota, Beta = 0 %, Itor = 0 kA



high_iota

Originalgeometrie, High Iota, Beta = 0 %, Itor = 0 kA



high_iota

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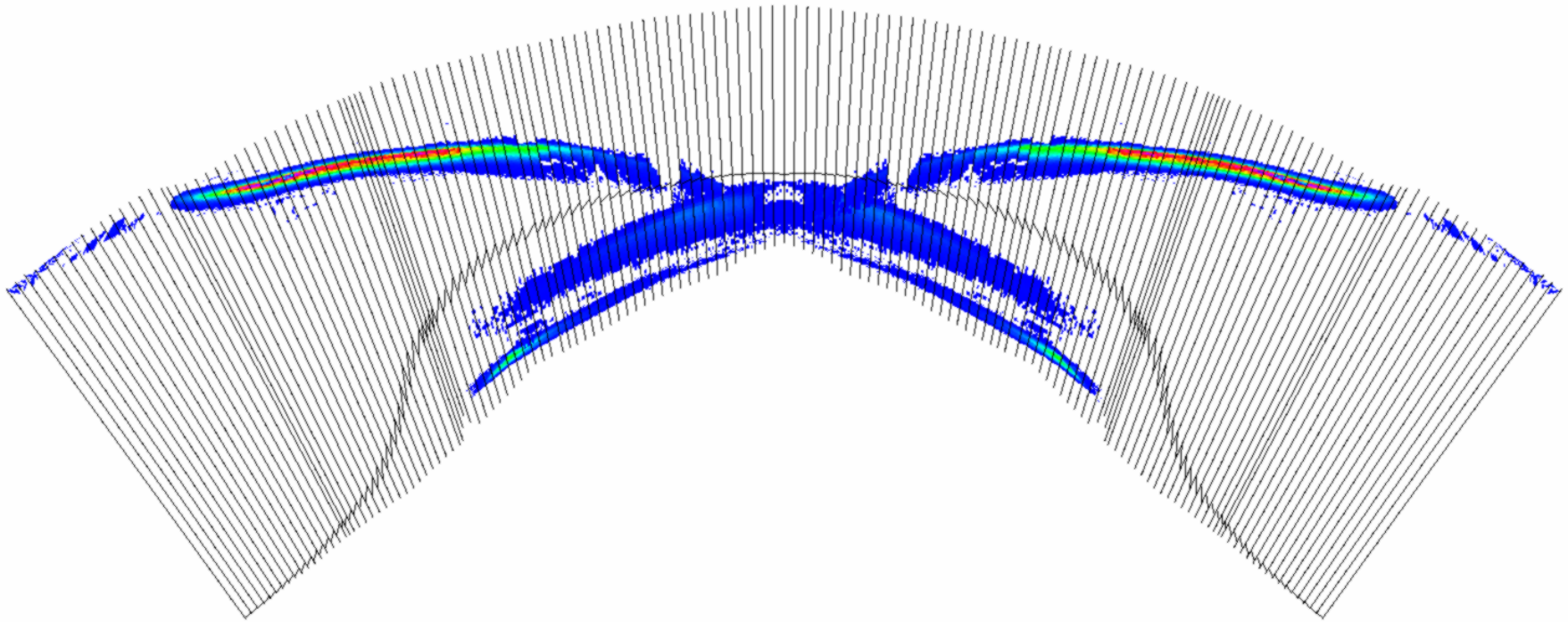
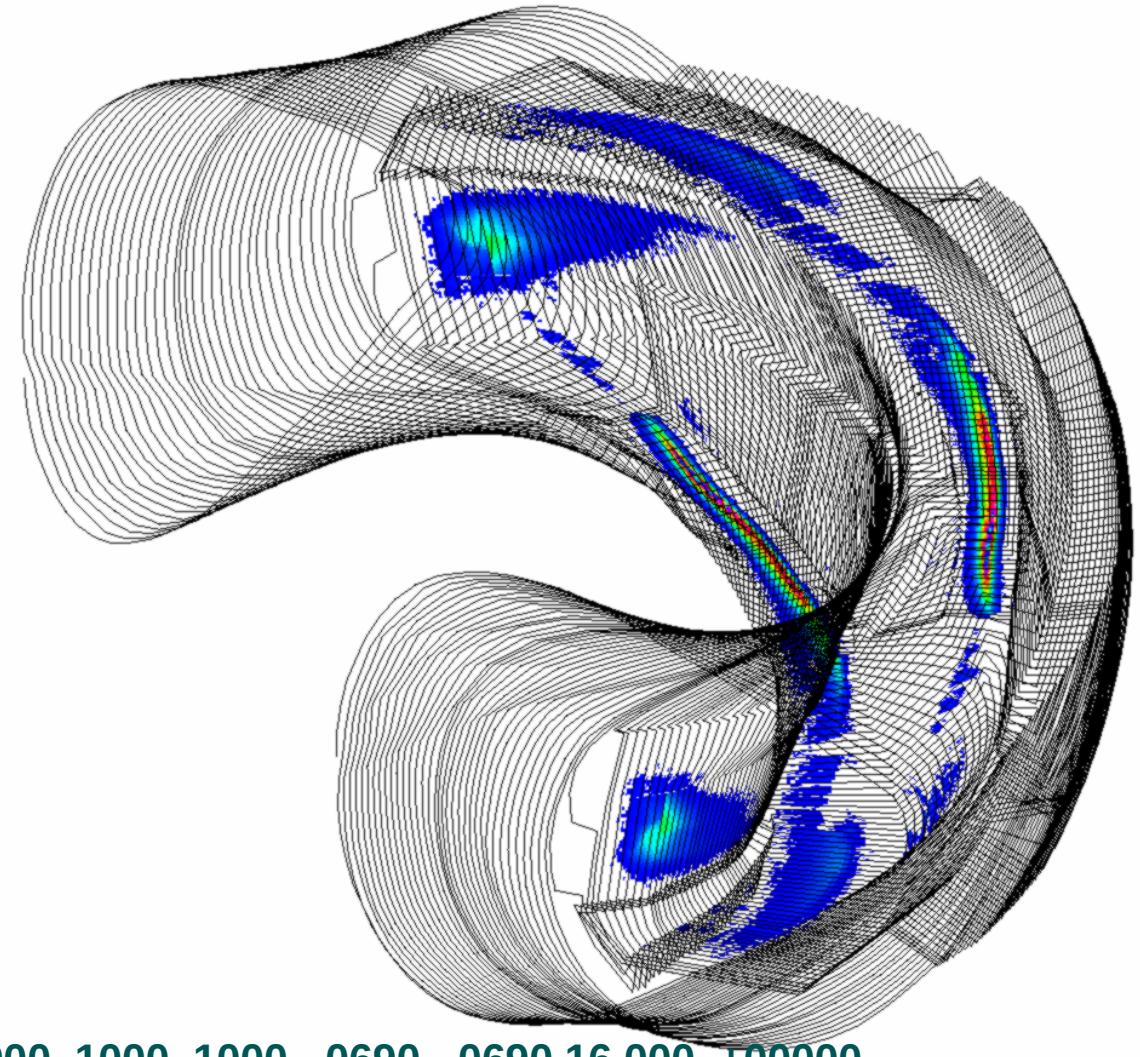


high_iota

Originalgeometrie, High Iota, Beta = 0 %, Itor = 0 kA



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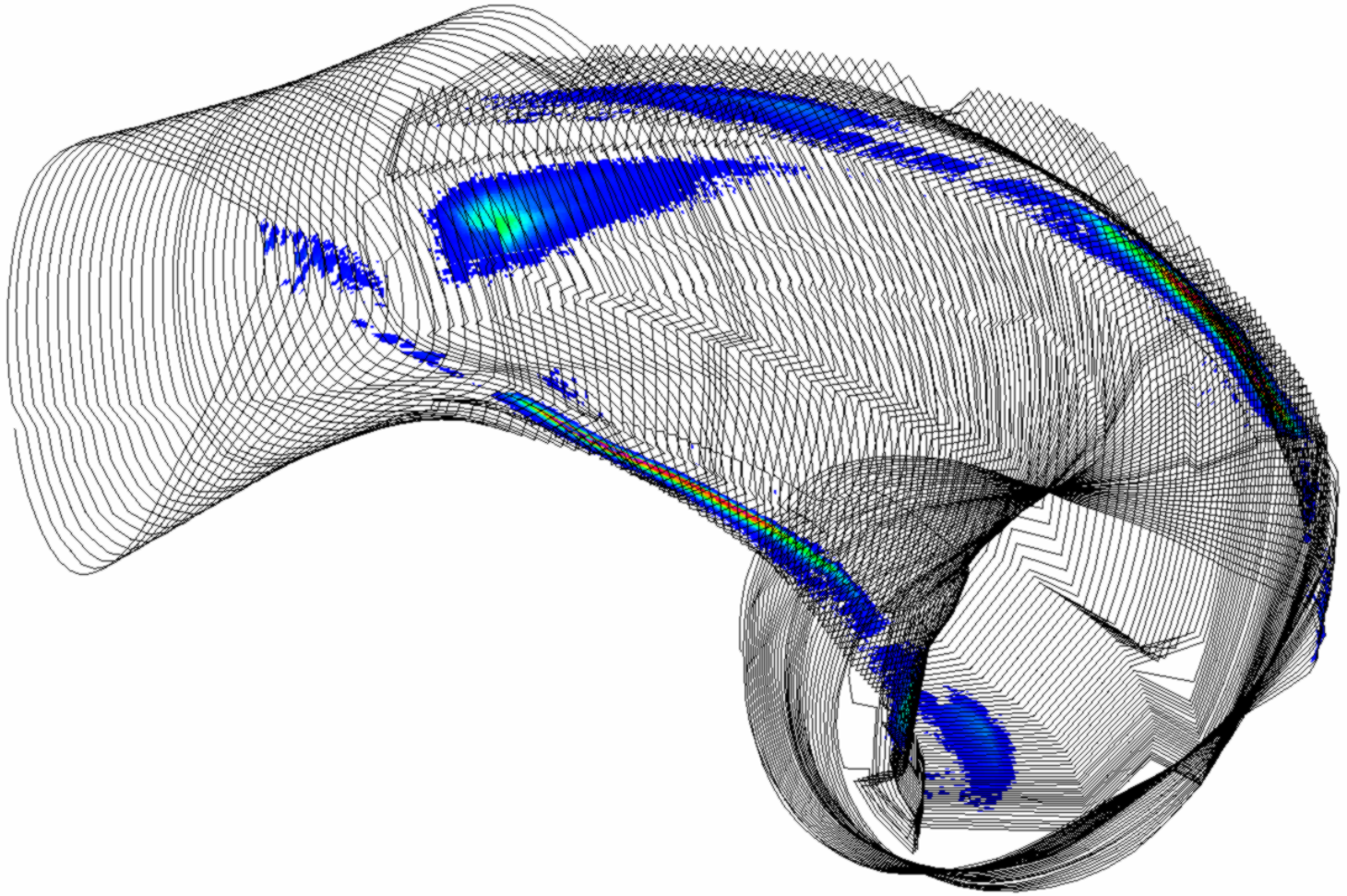
Originalgeometrie, High Iota, Beta = 0 %, Itor = 0 kA



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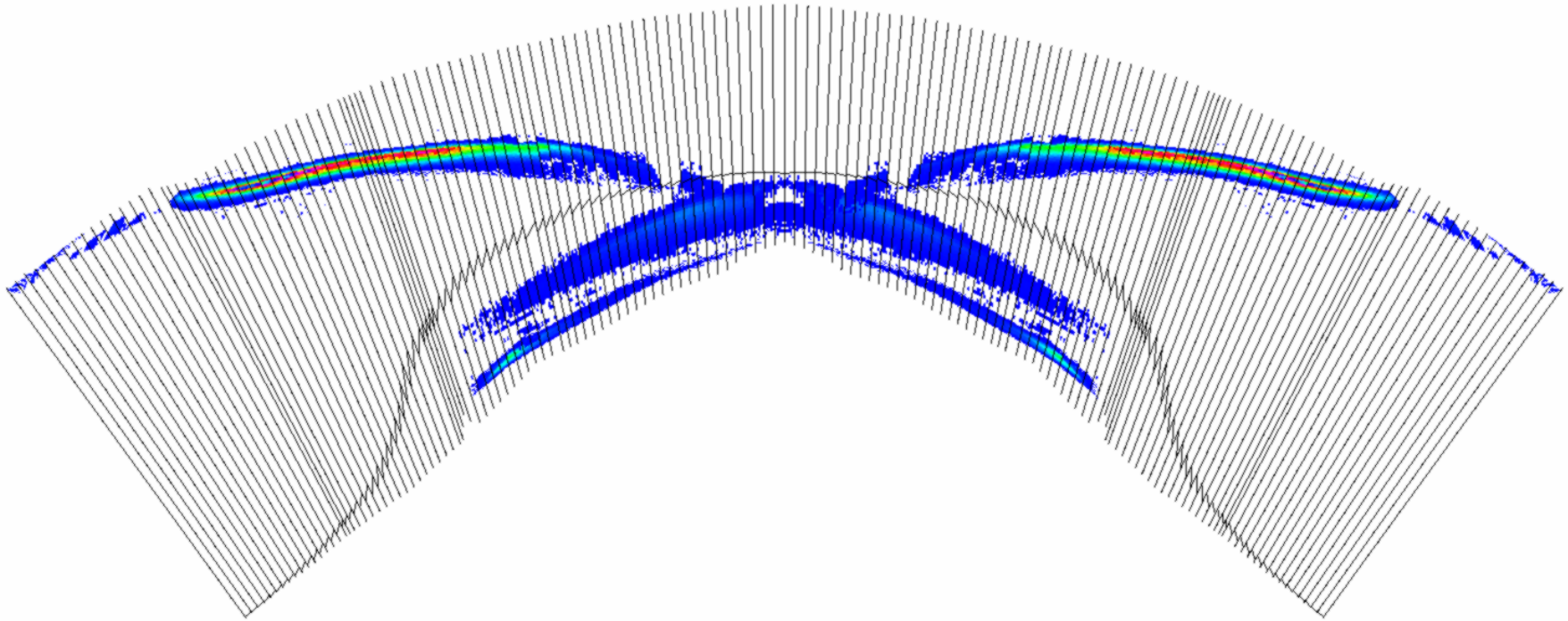
Originalgeometrie, High Iota, Beta = 0 %, Itor = 0 kA



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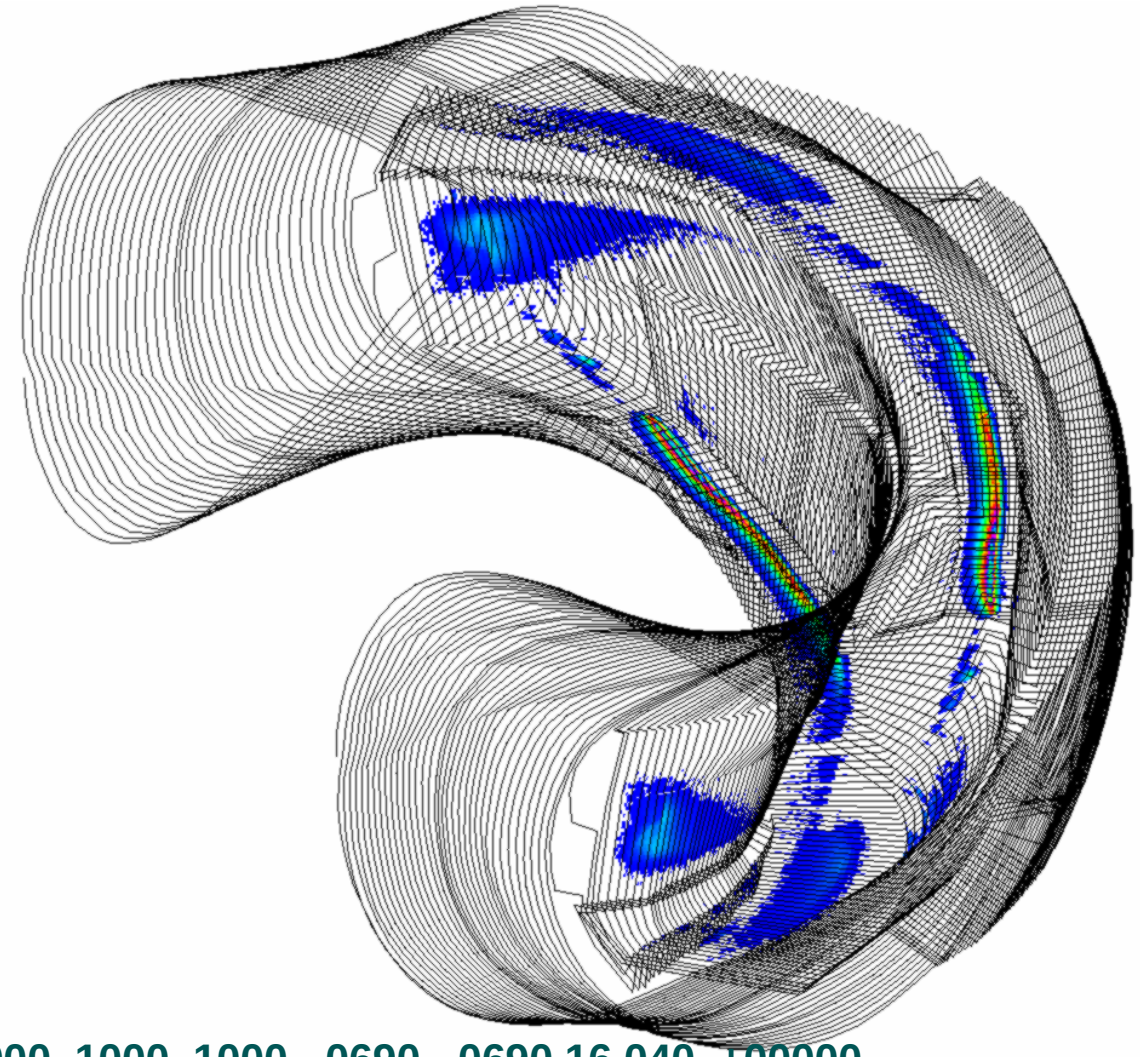
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 0 kA



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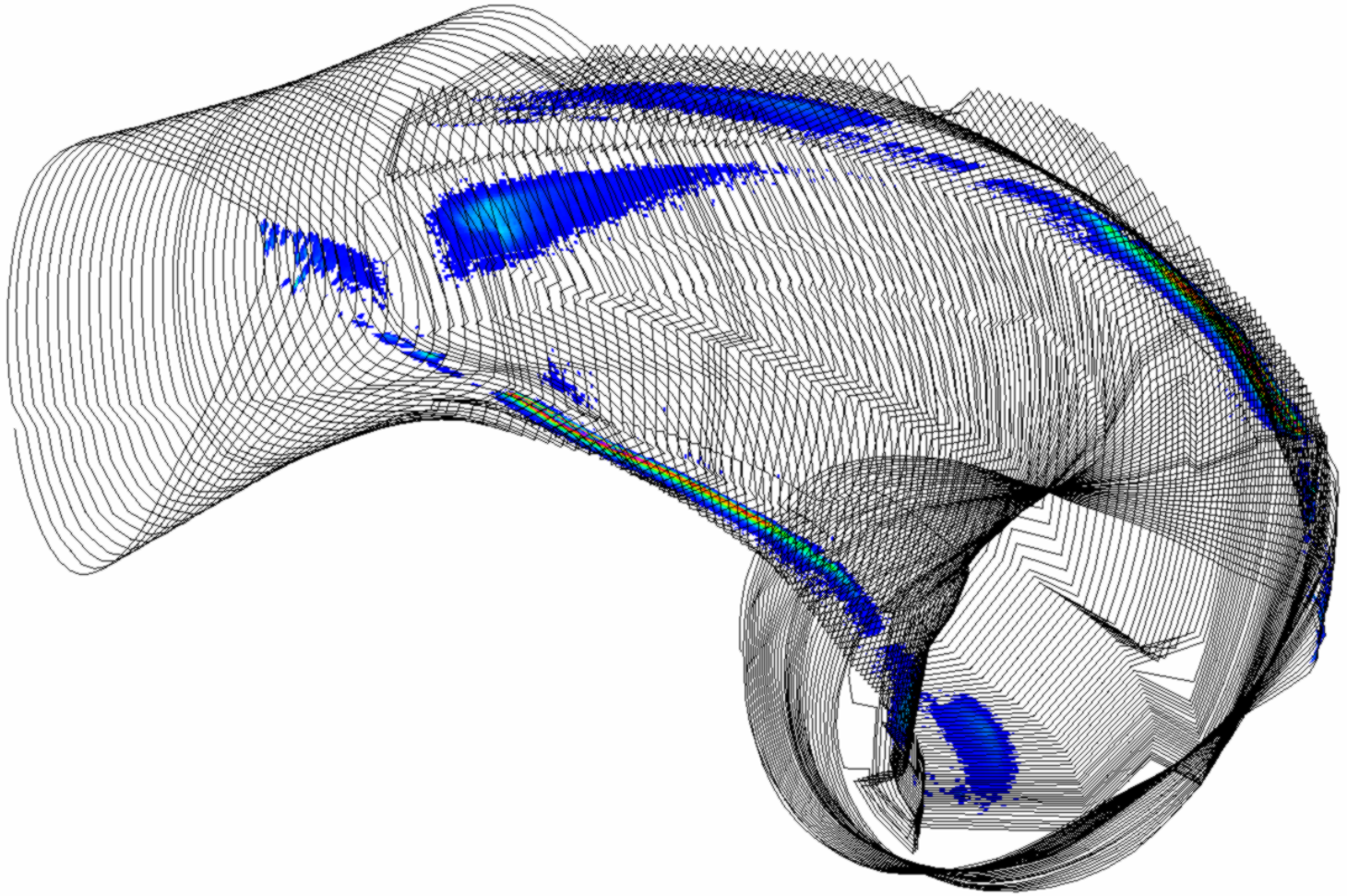
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 0 kA



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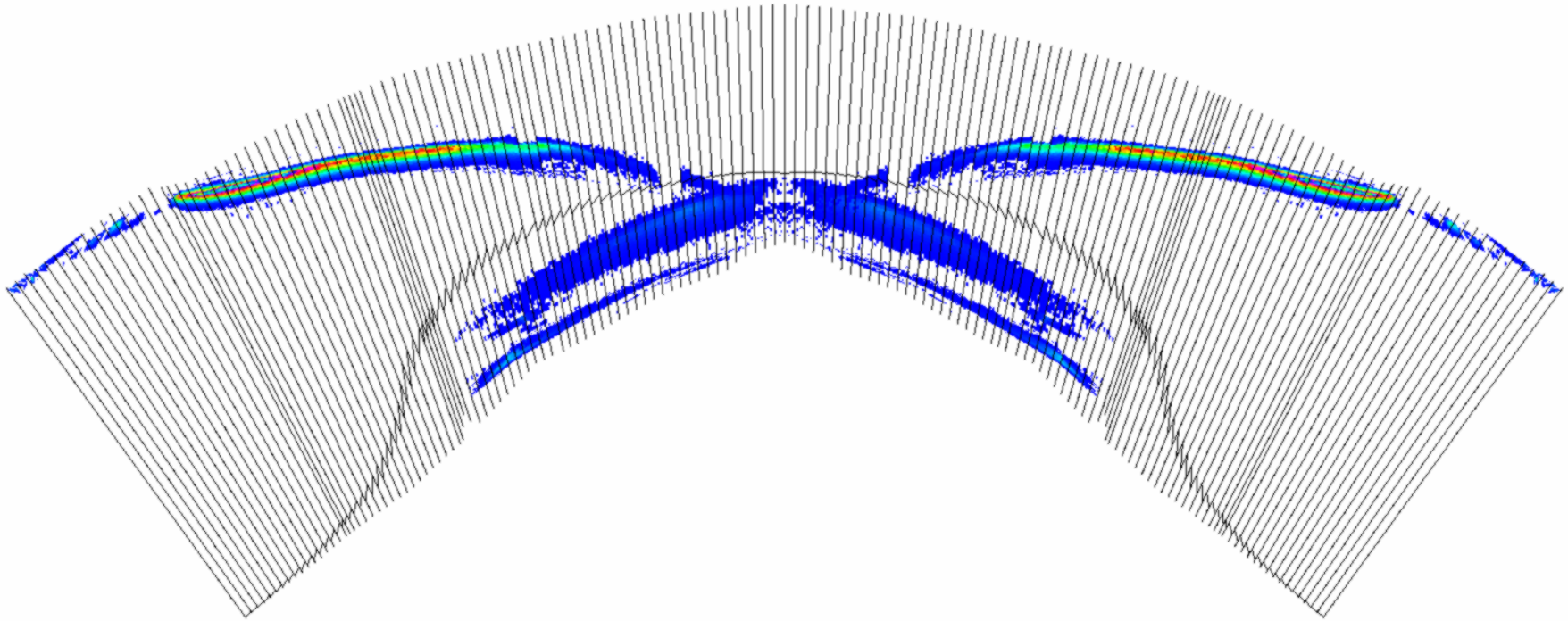
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 0 kA



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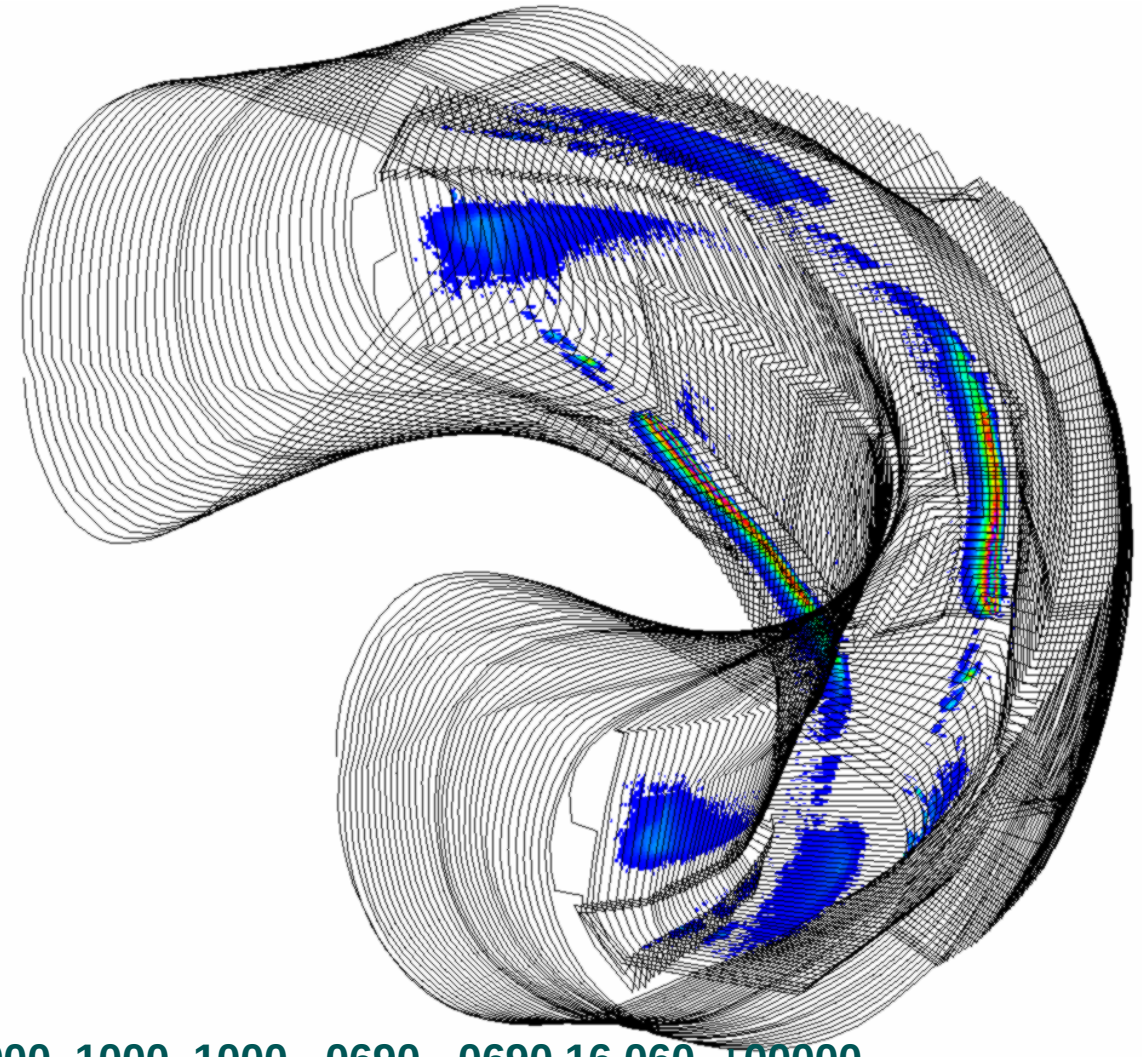

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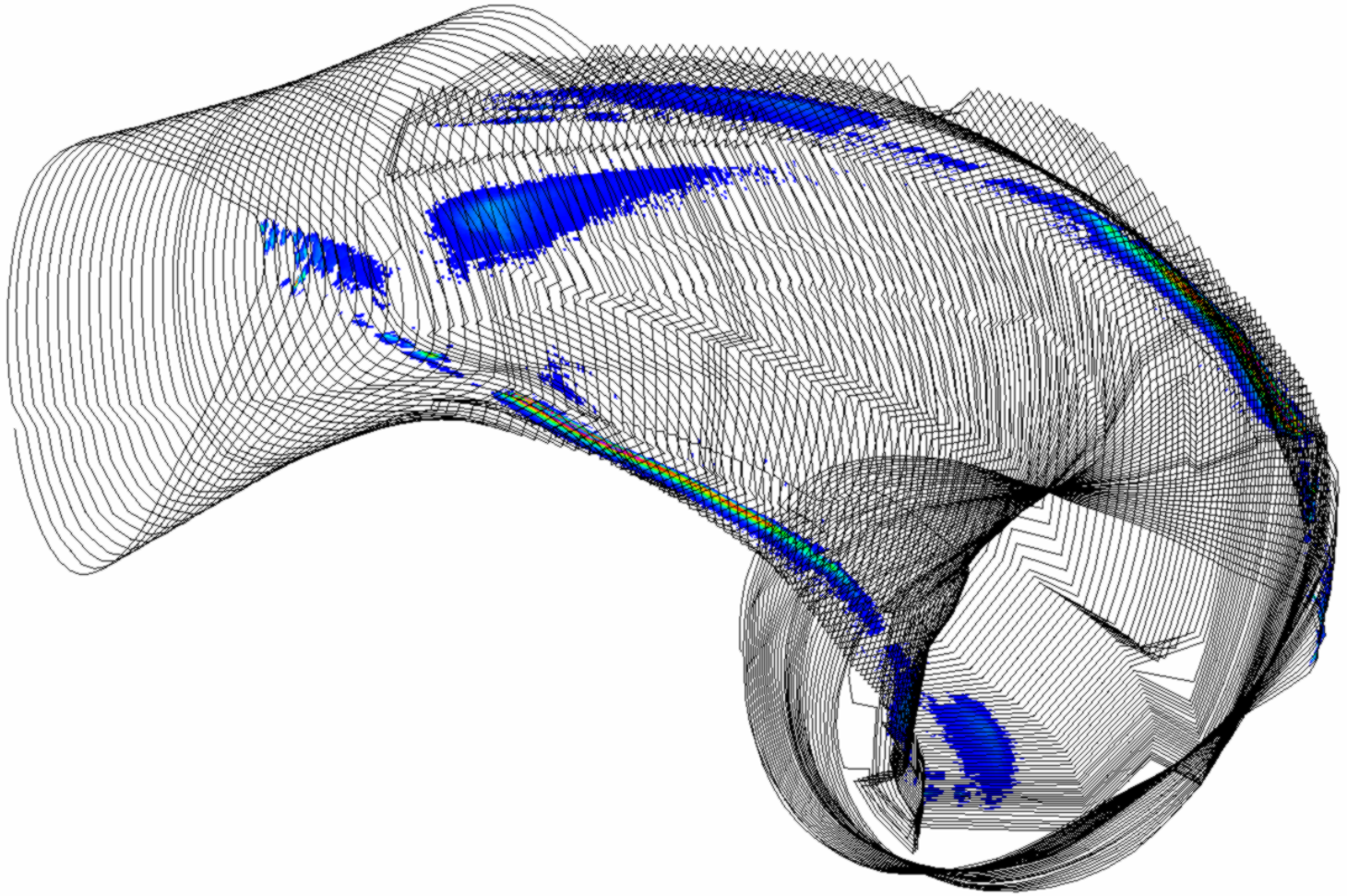

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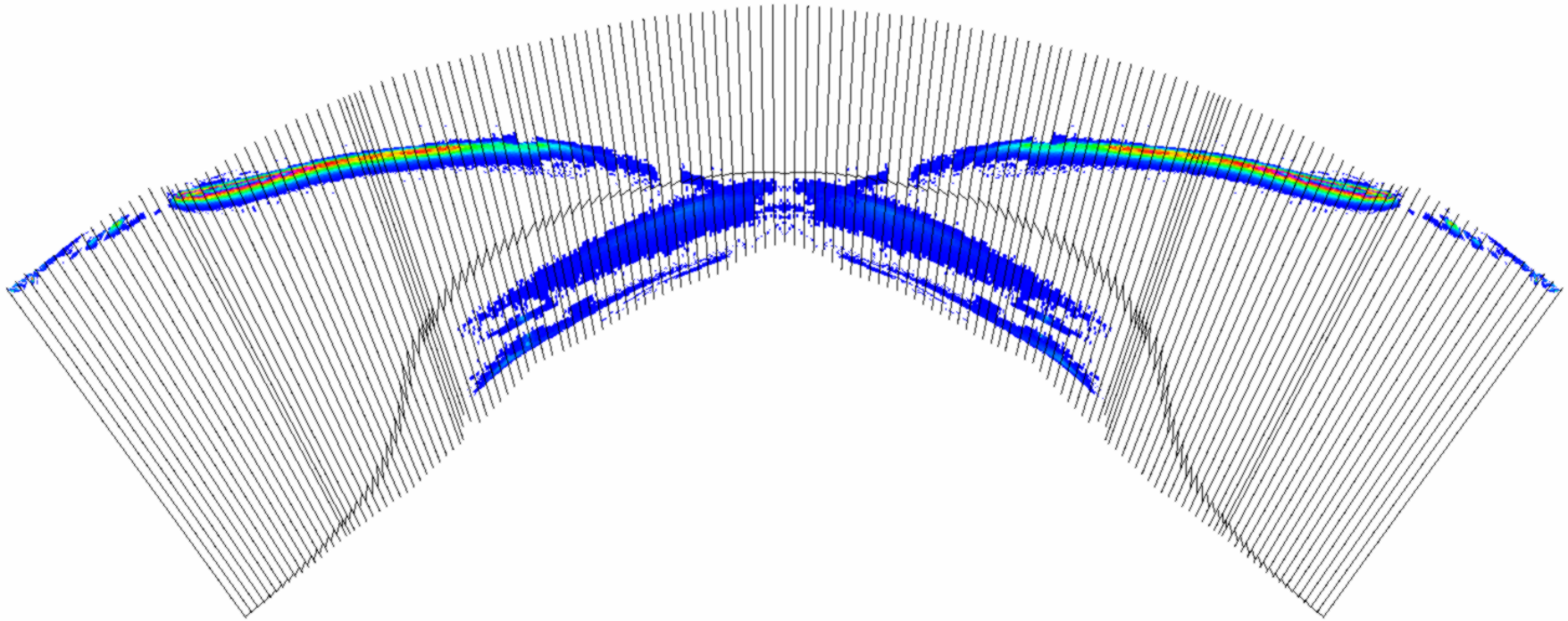
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 0 kA



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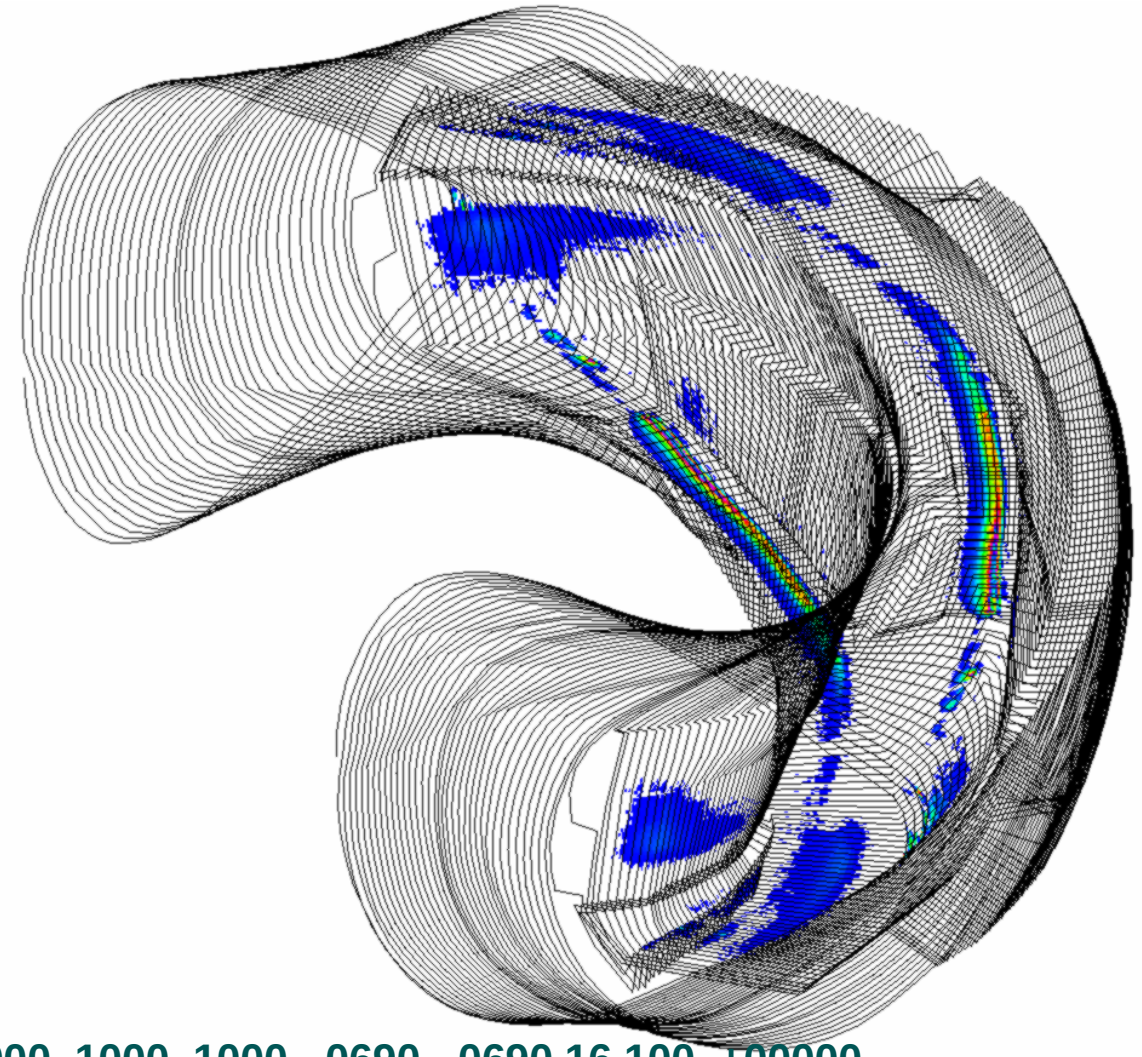

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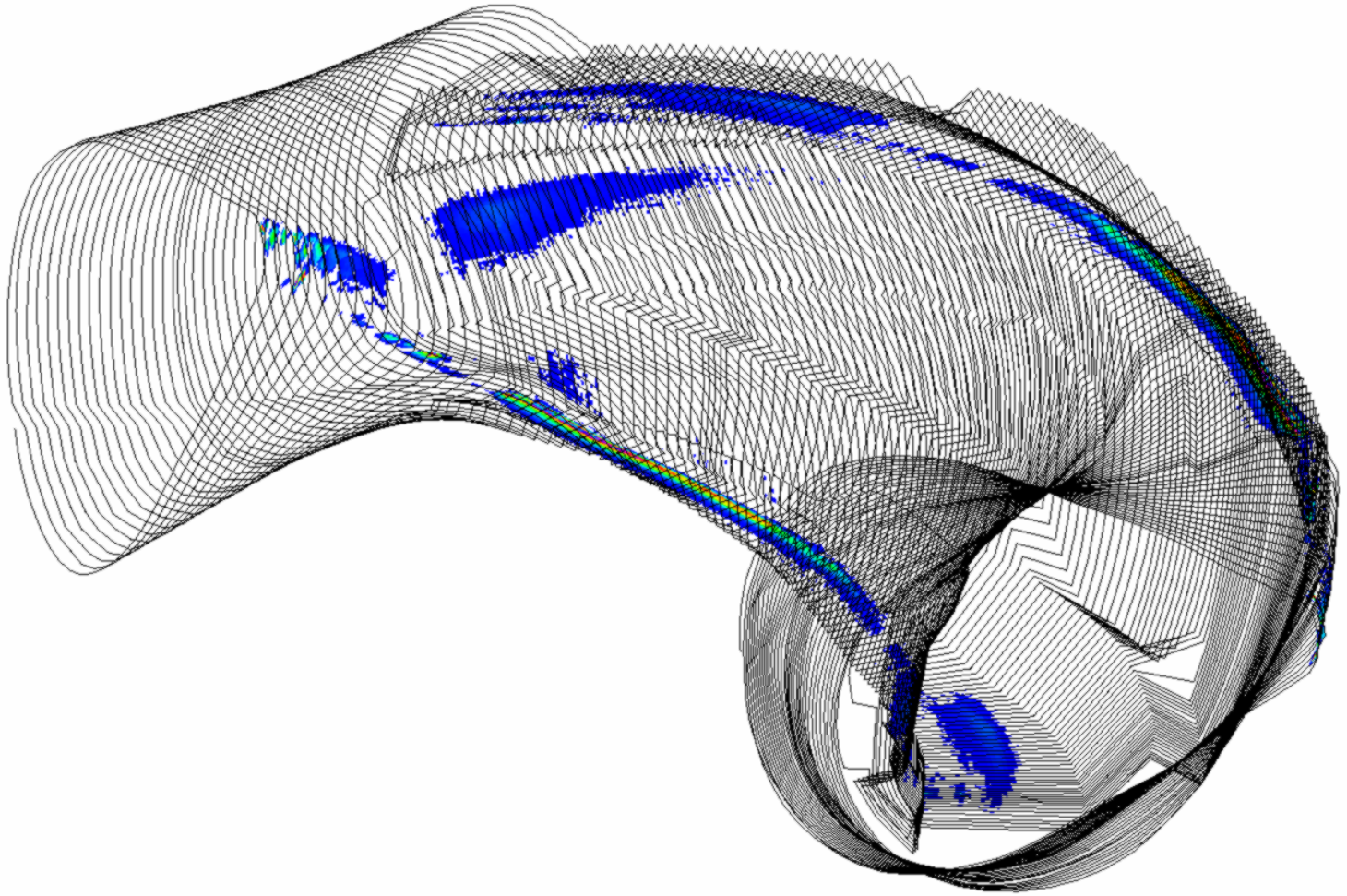

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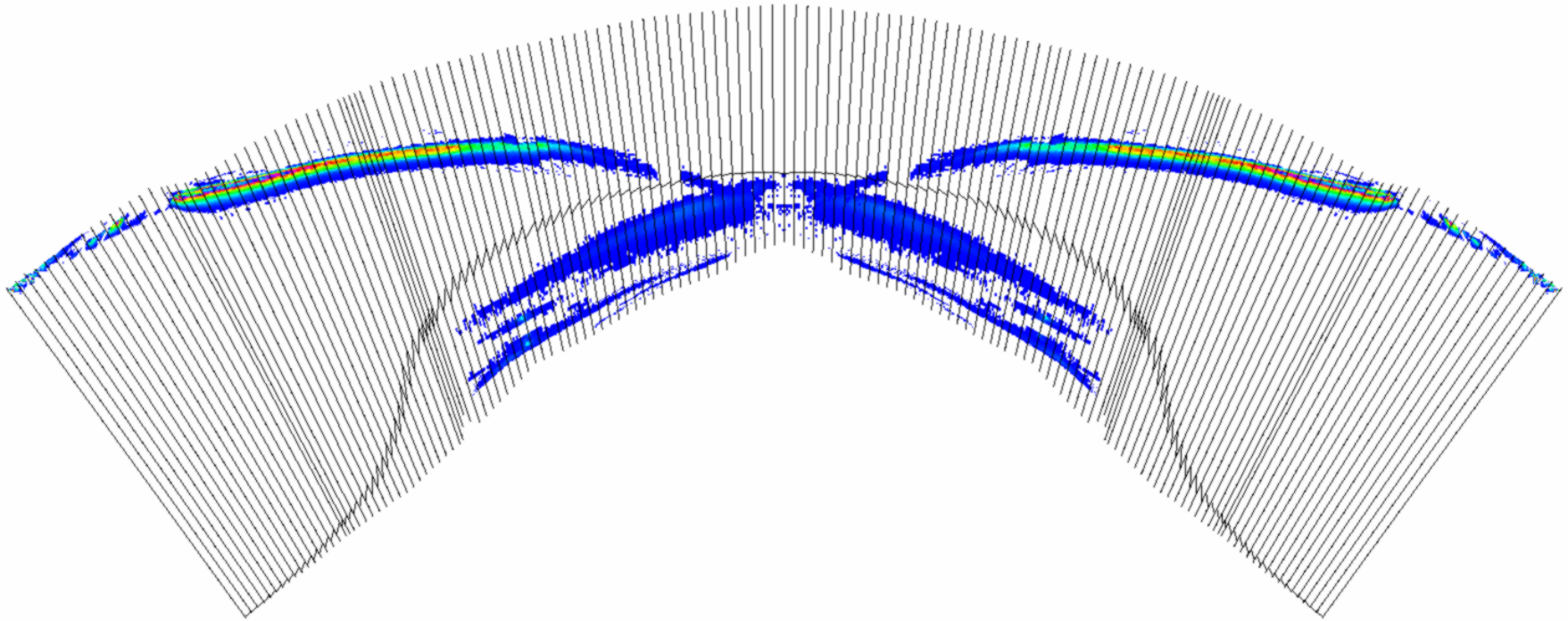
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 0 kA



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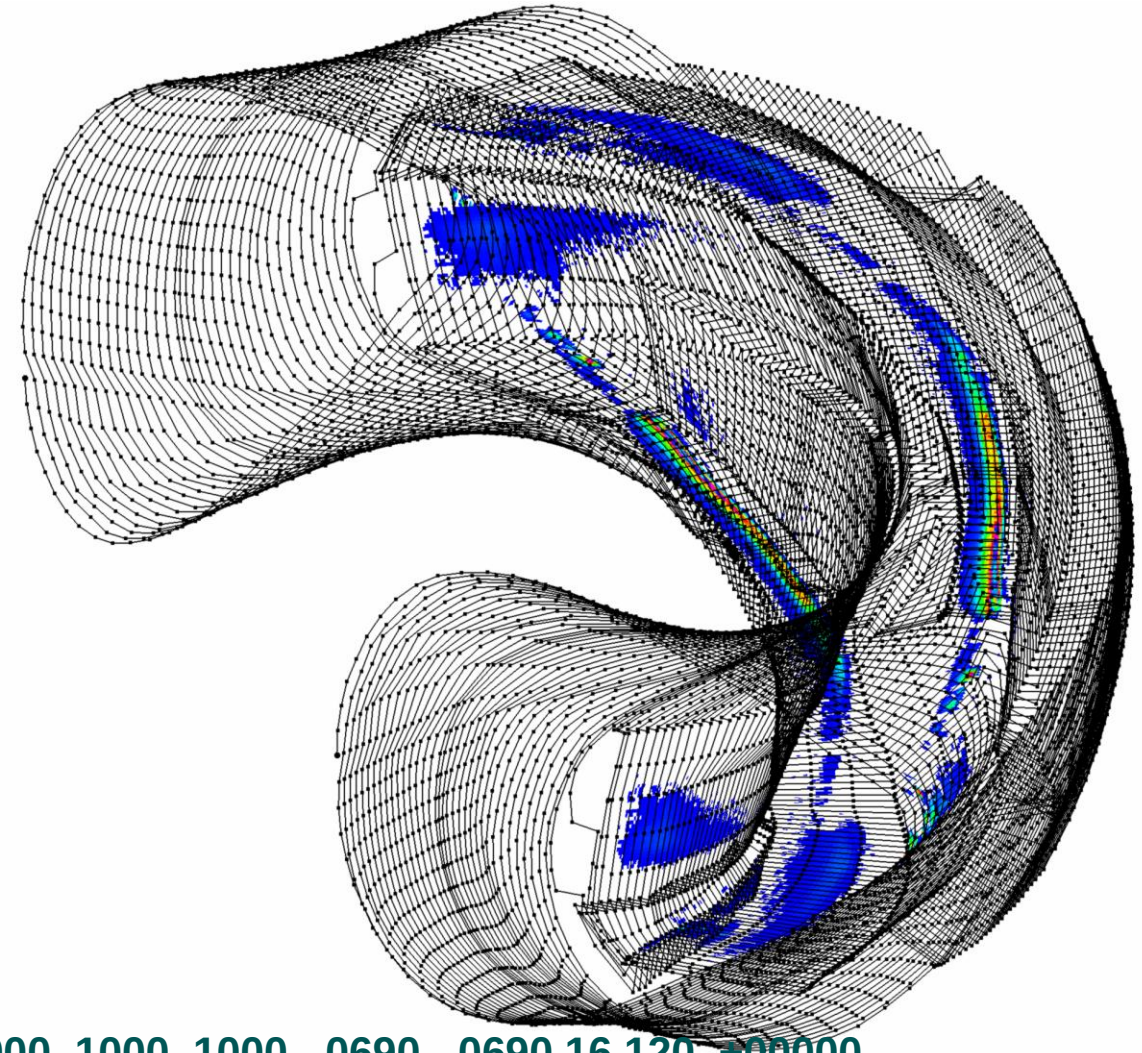
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 0 kA



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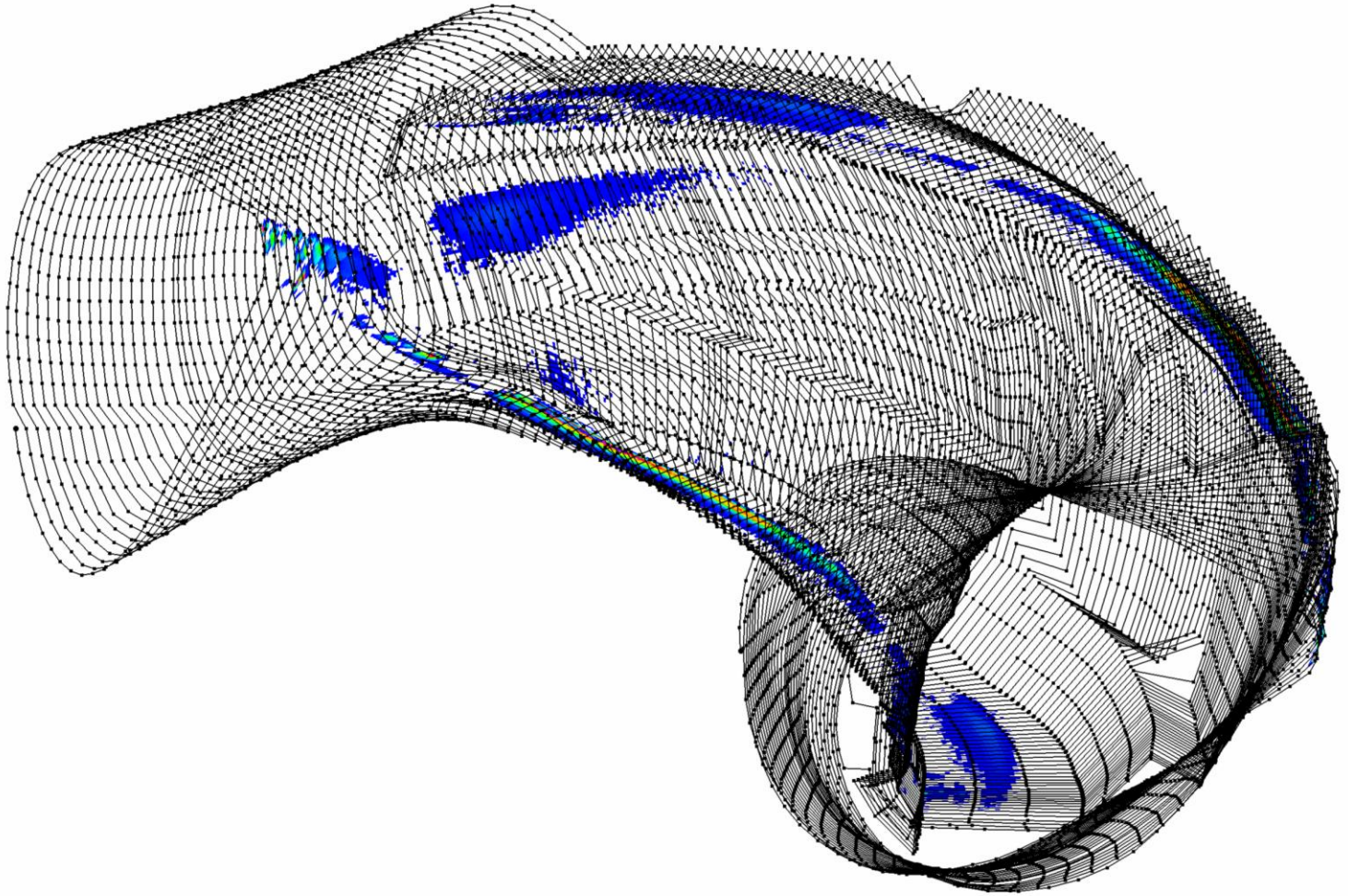
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 0 kA



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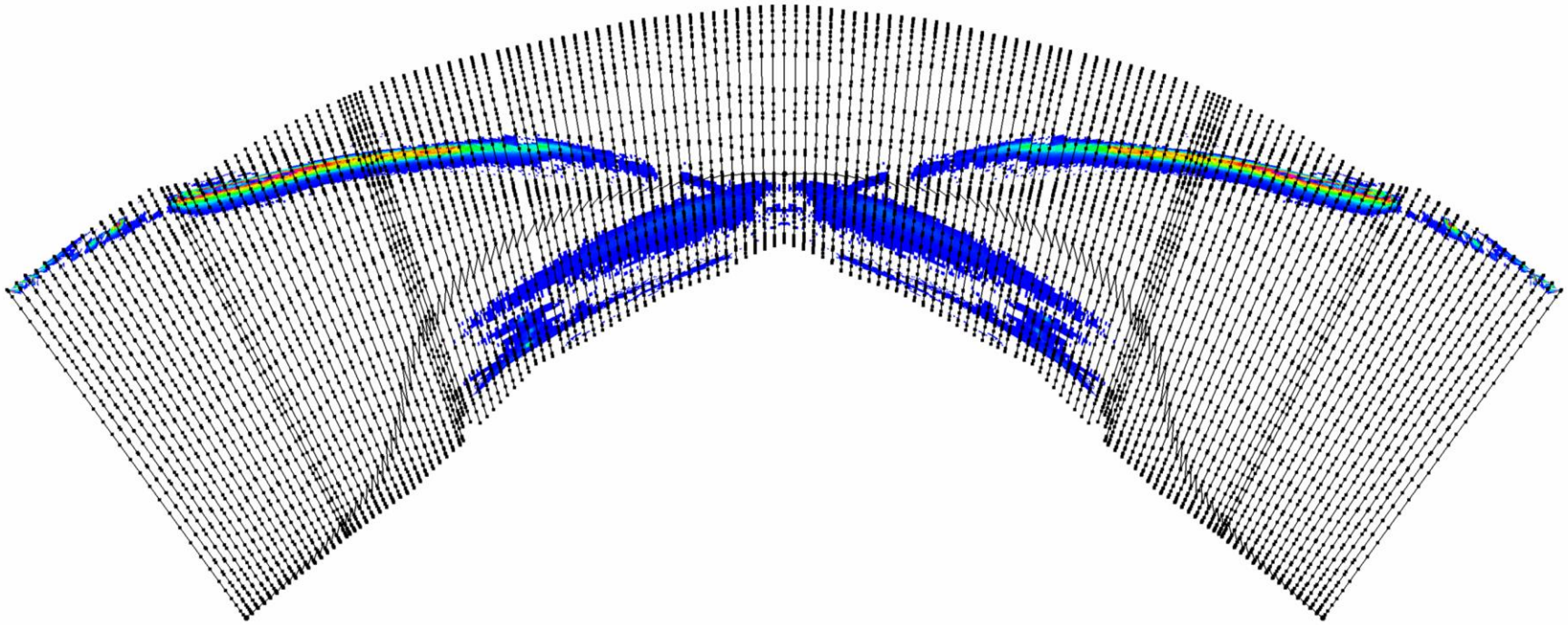
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 0 kA



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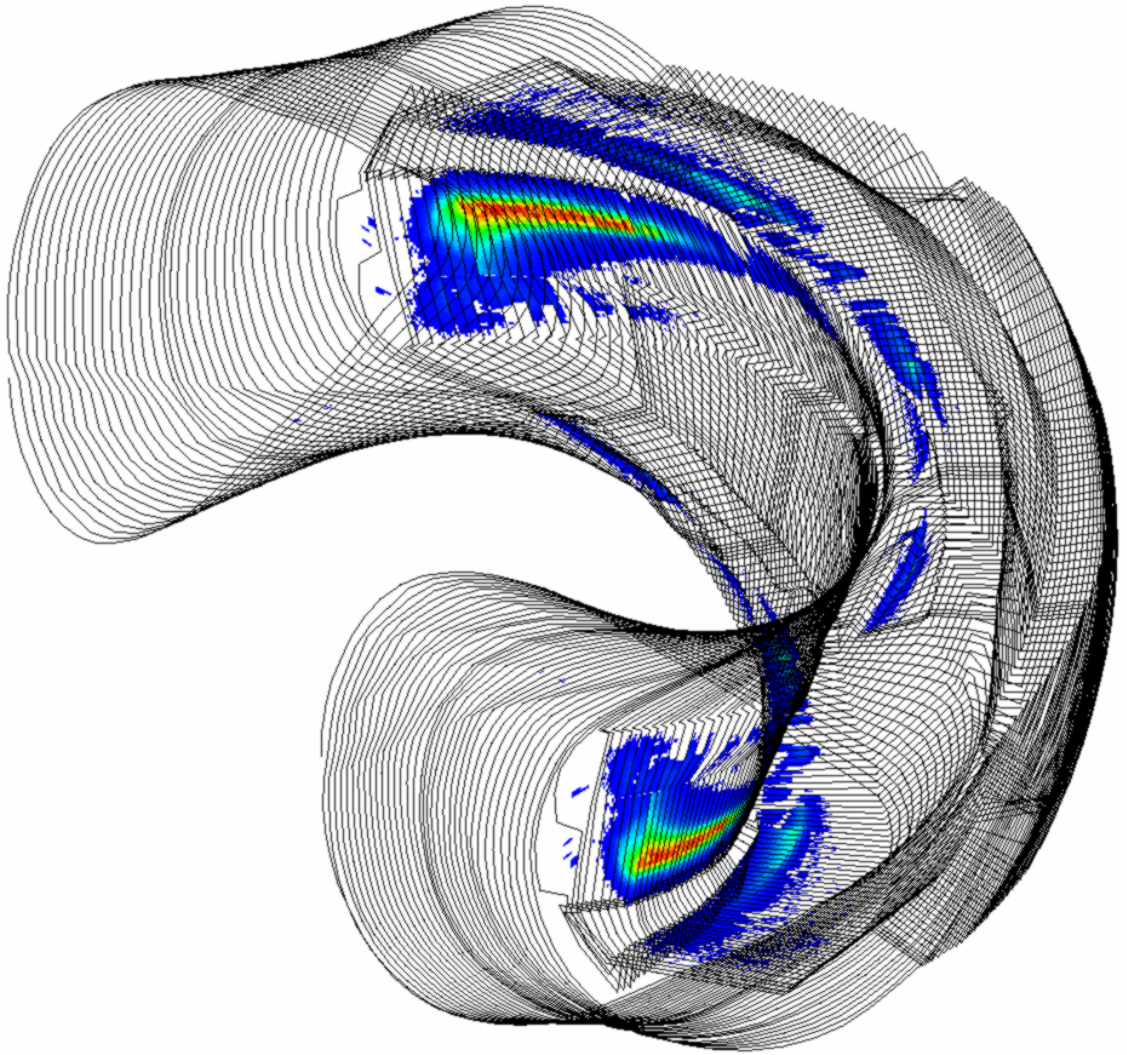
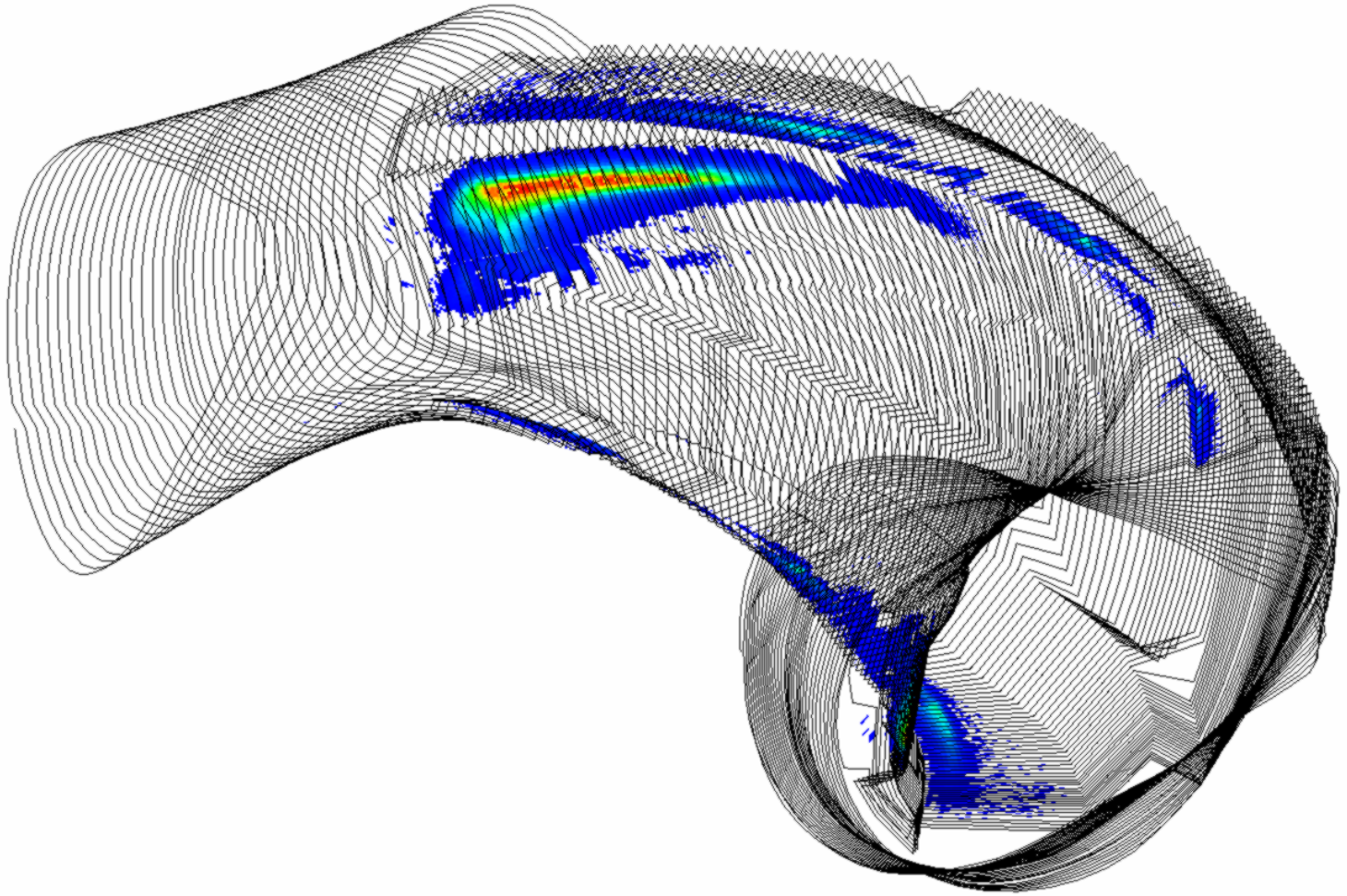


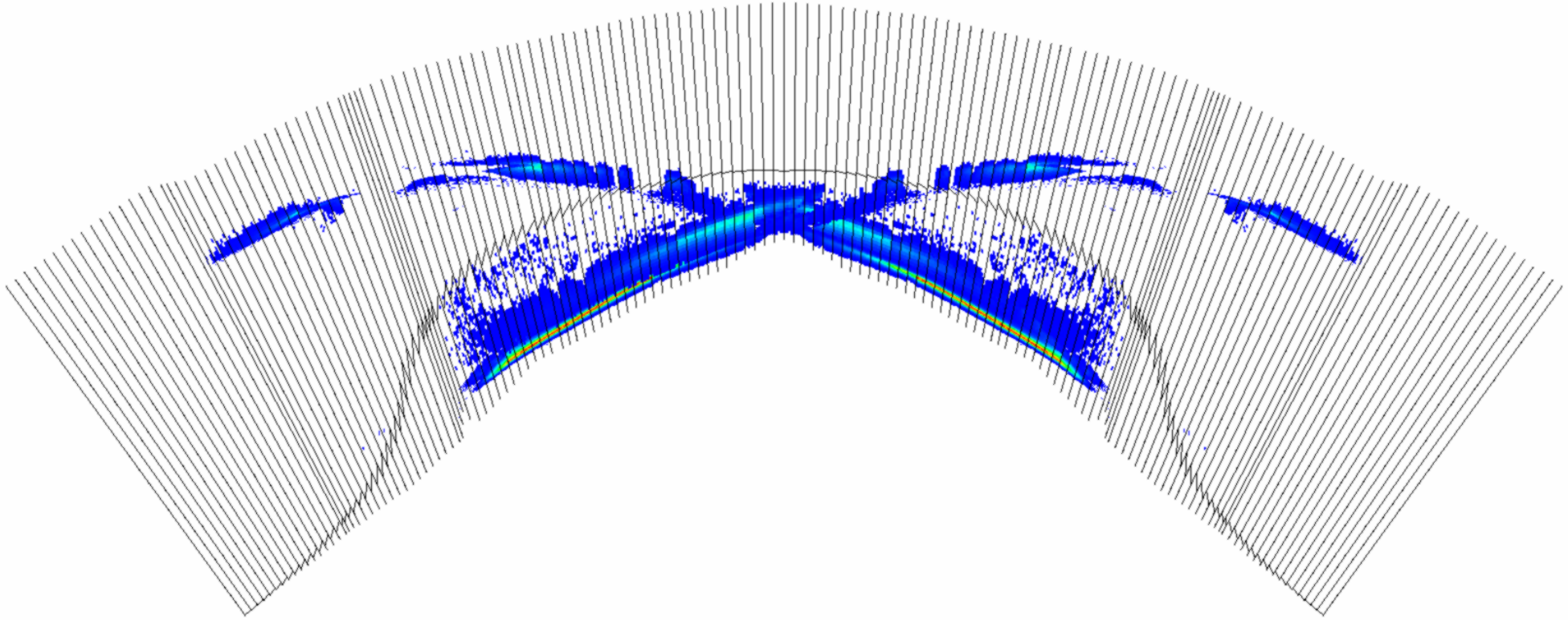
high_mirror

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 0 kA



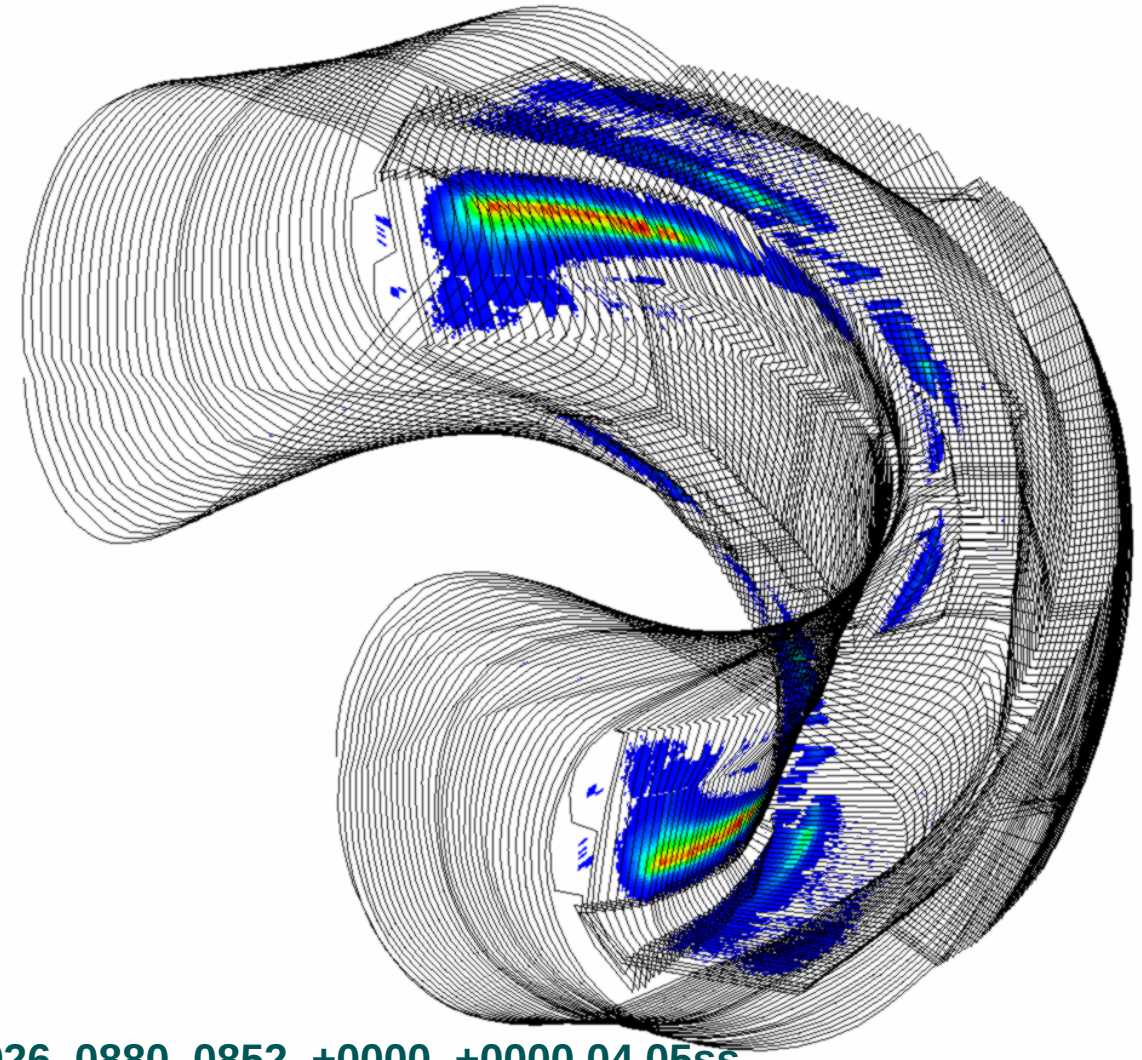
high_mirror

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 0 kA



high_mirror

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = 0 kA



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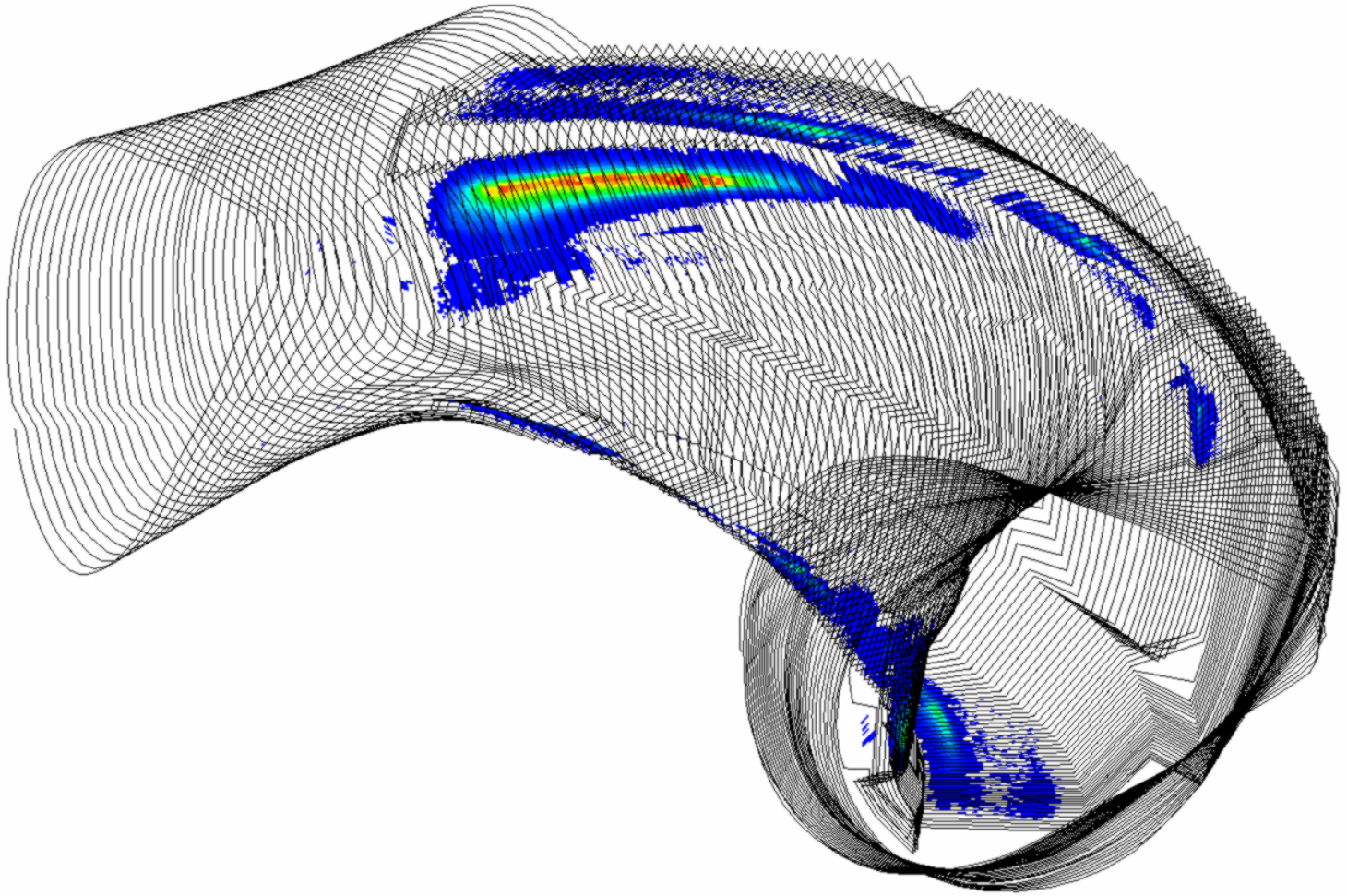
Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = 0 kA



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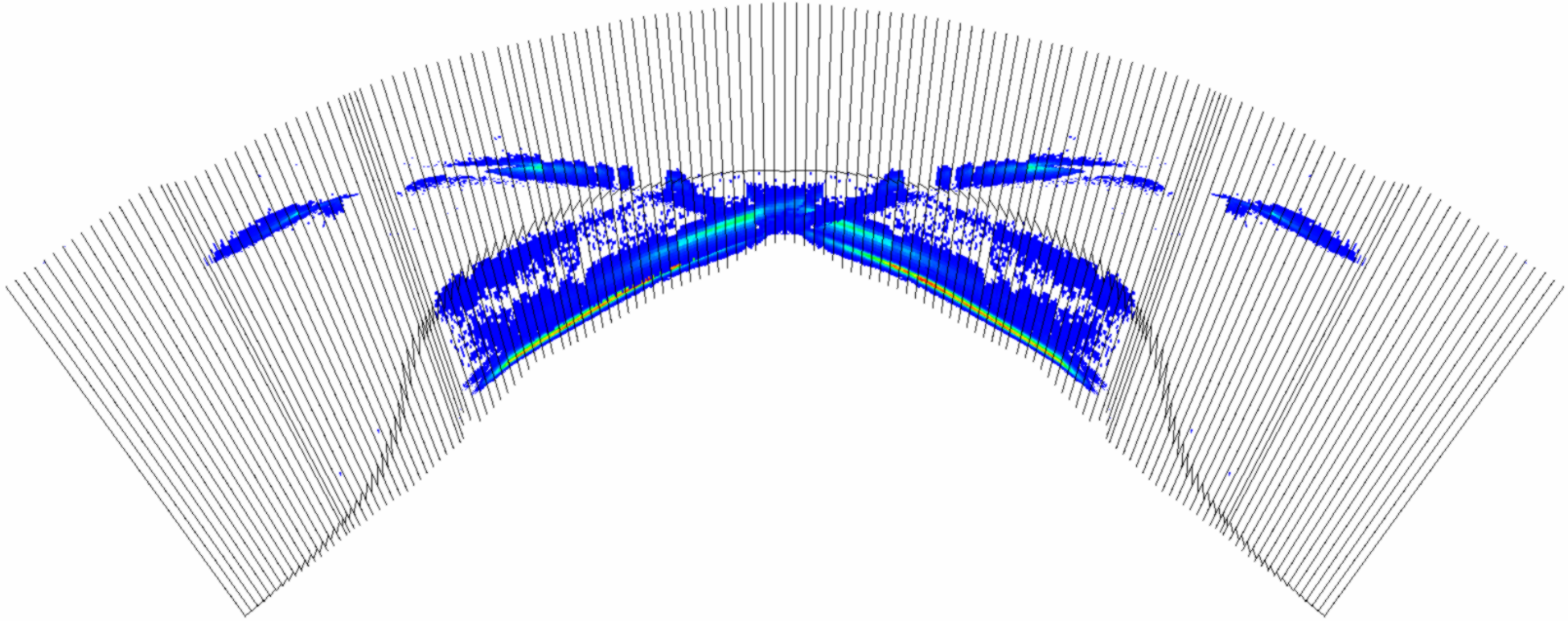
Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = 0 kA



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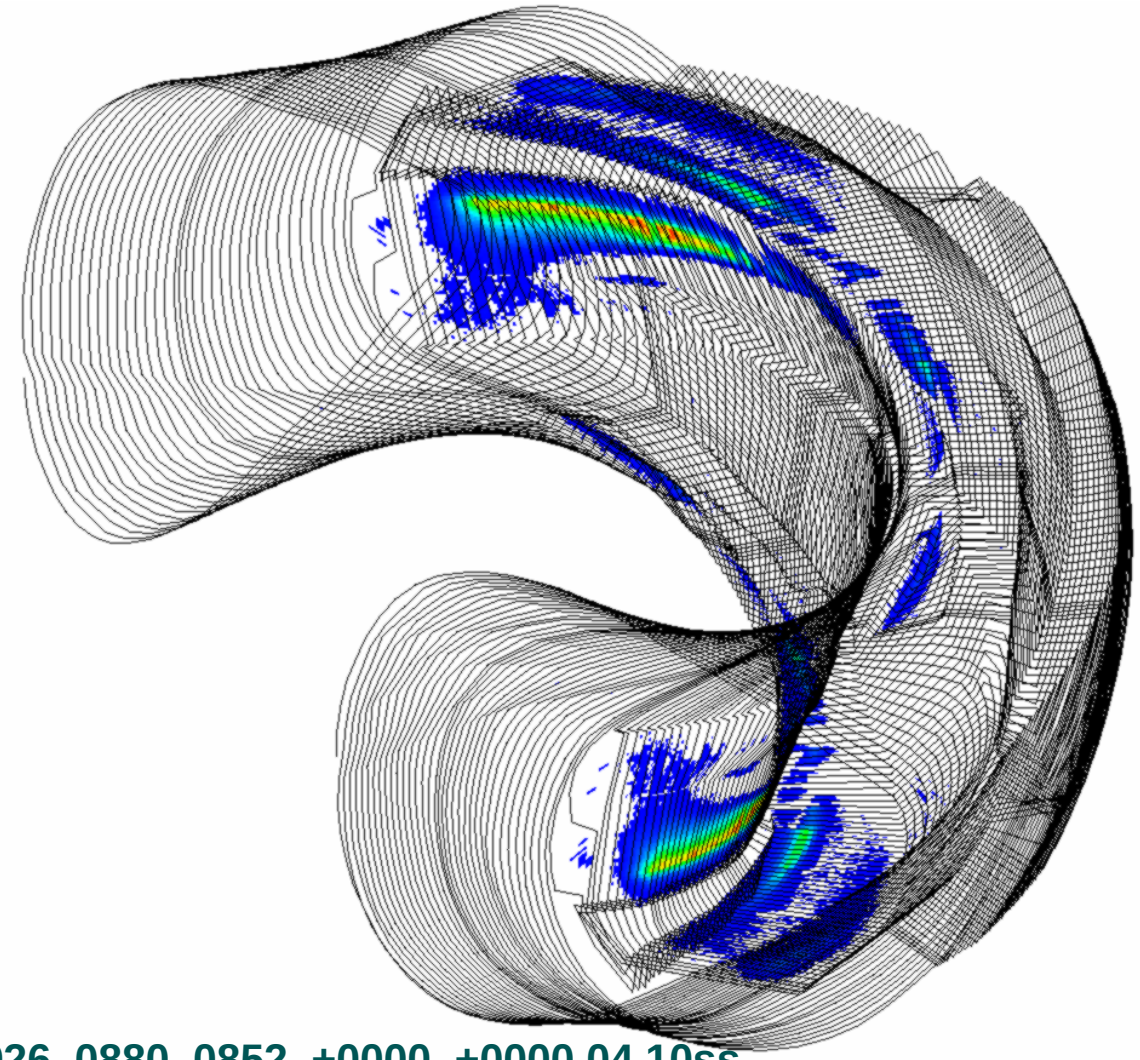

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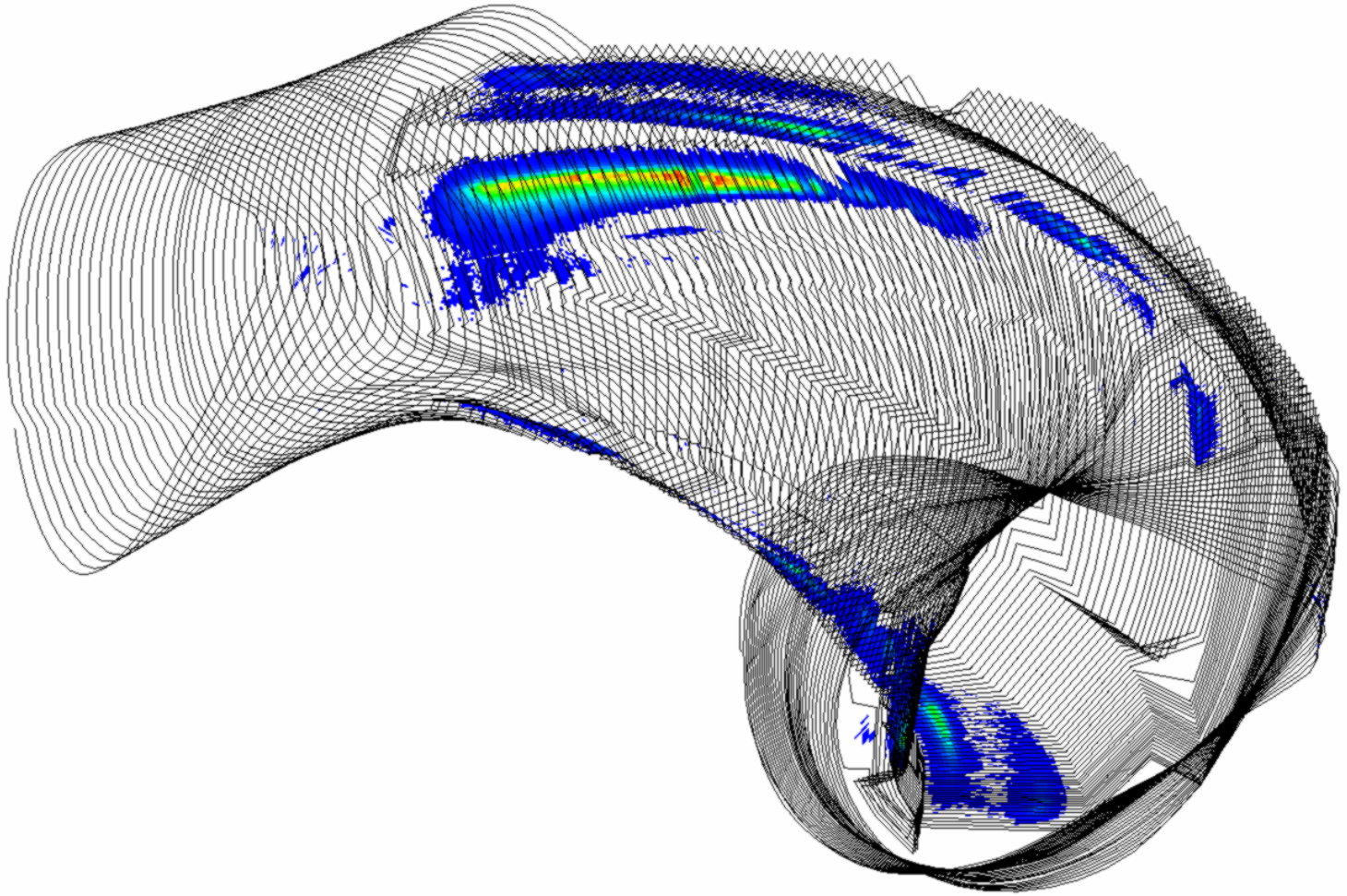

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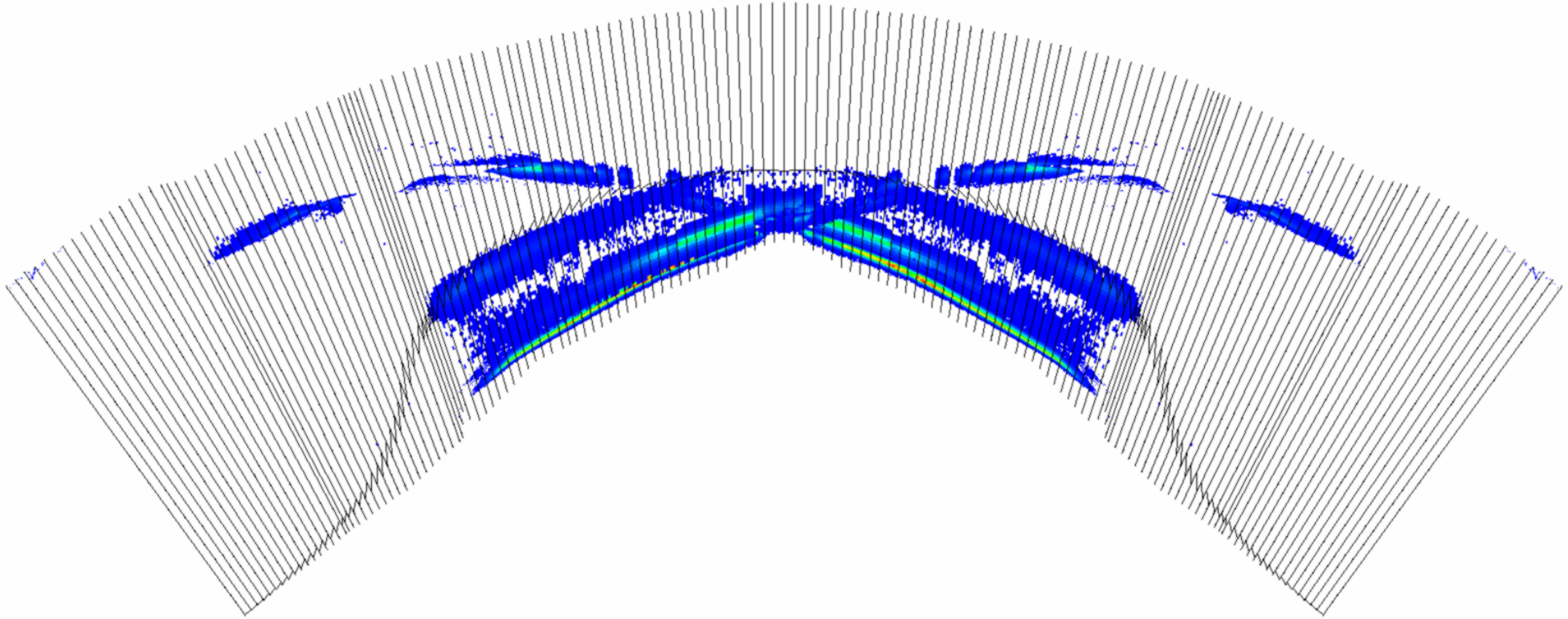
Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = 0 kA



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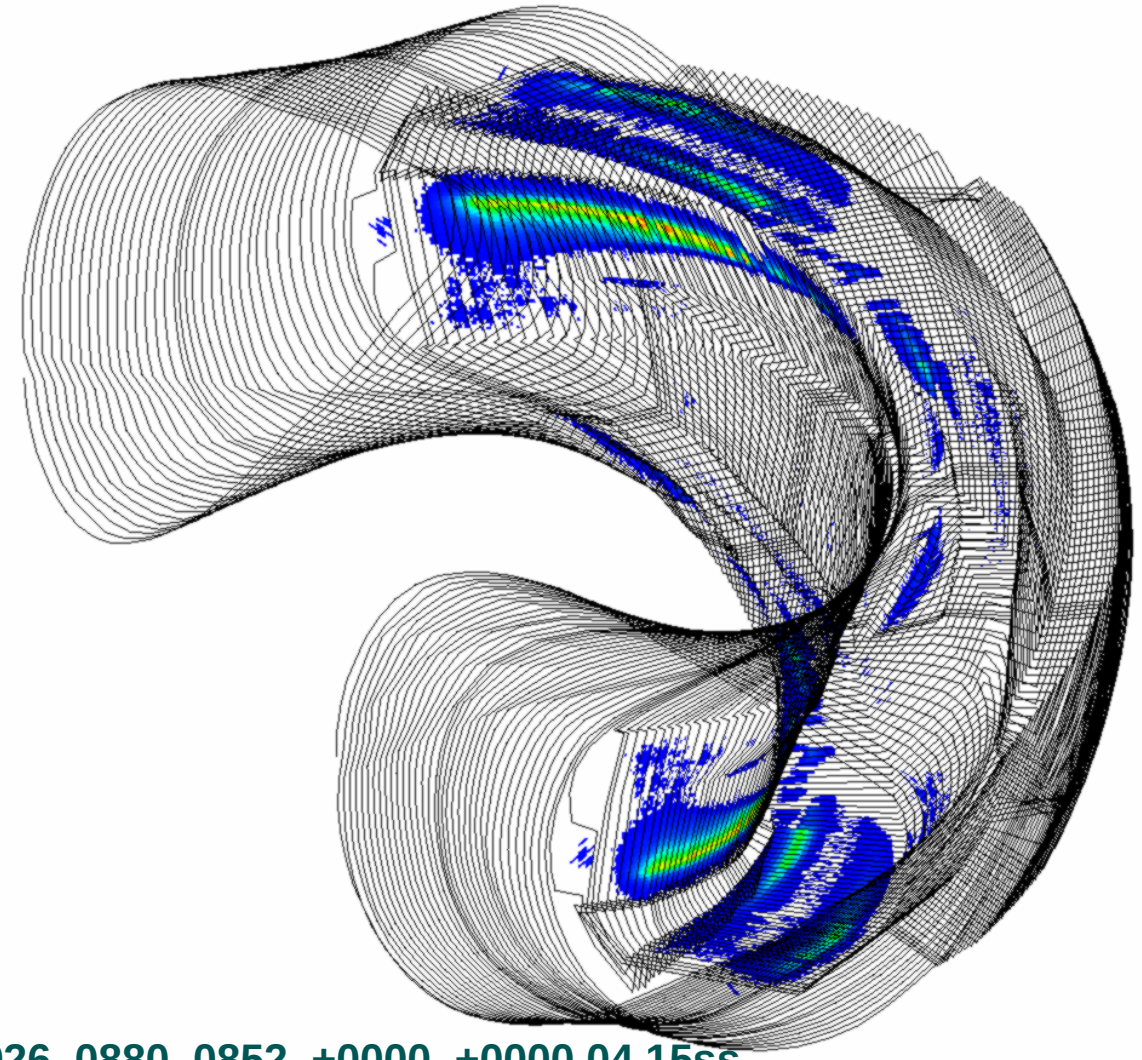
Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 0 kA



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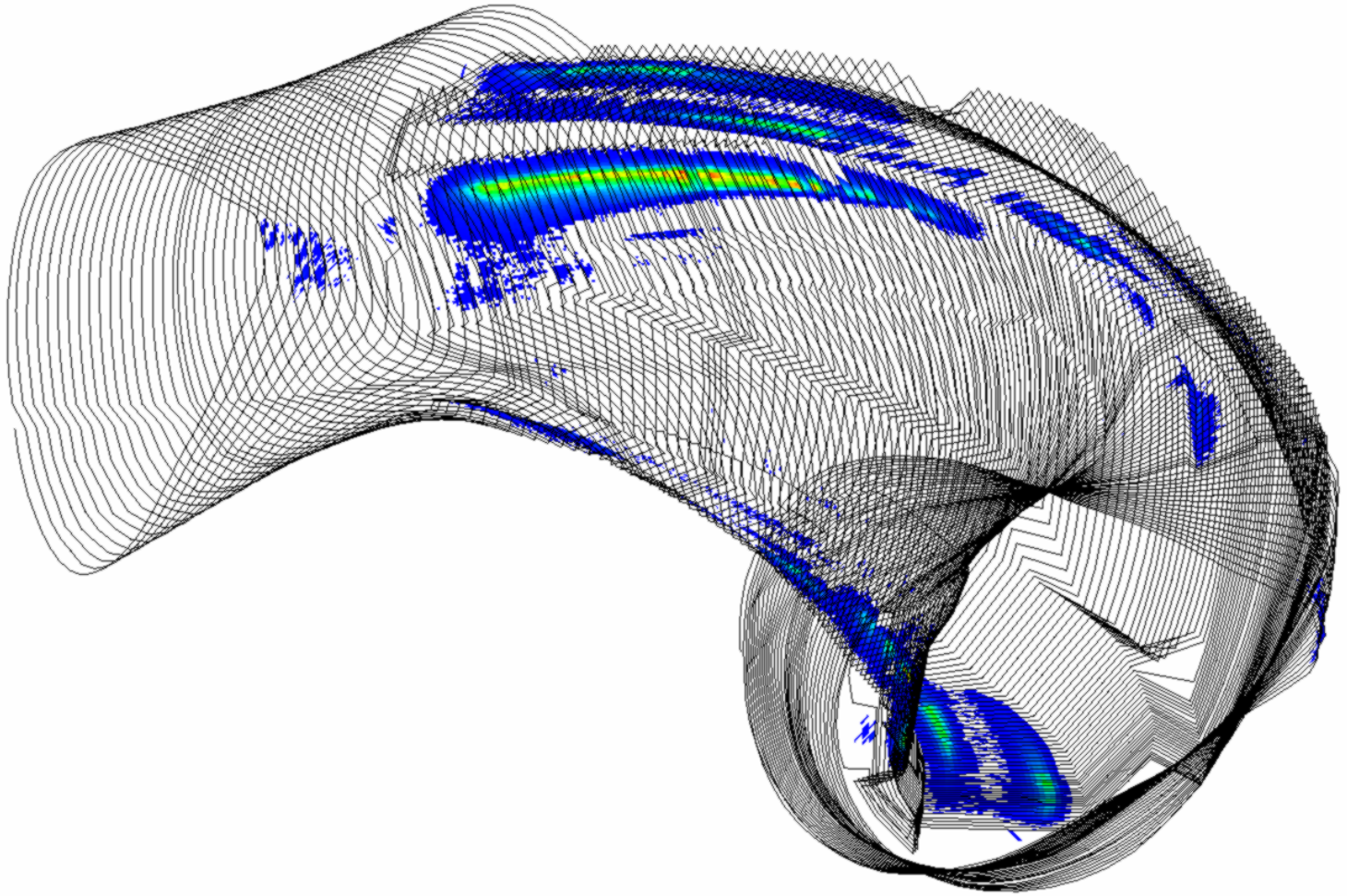
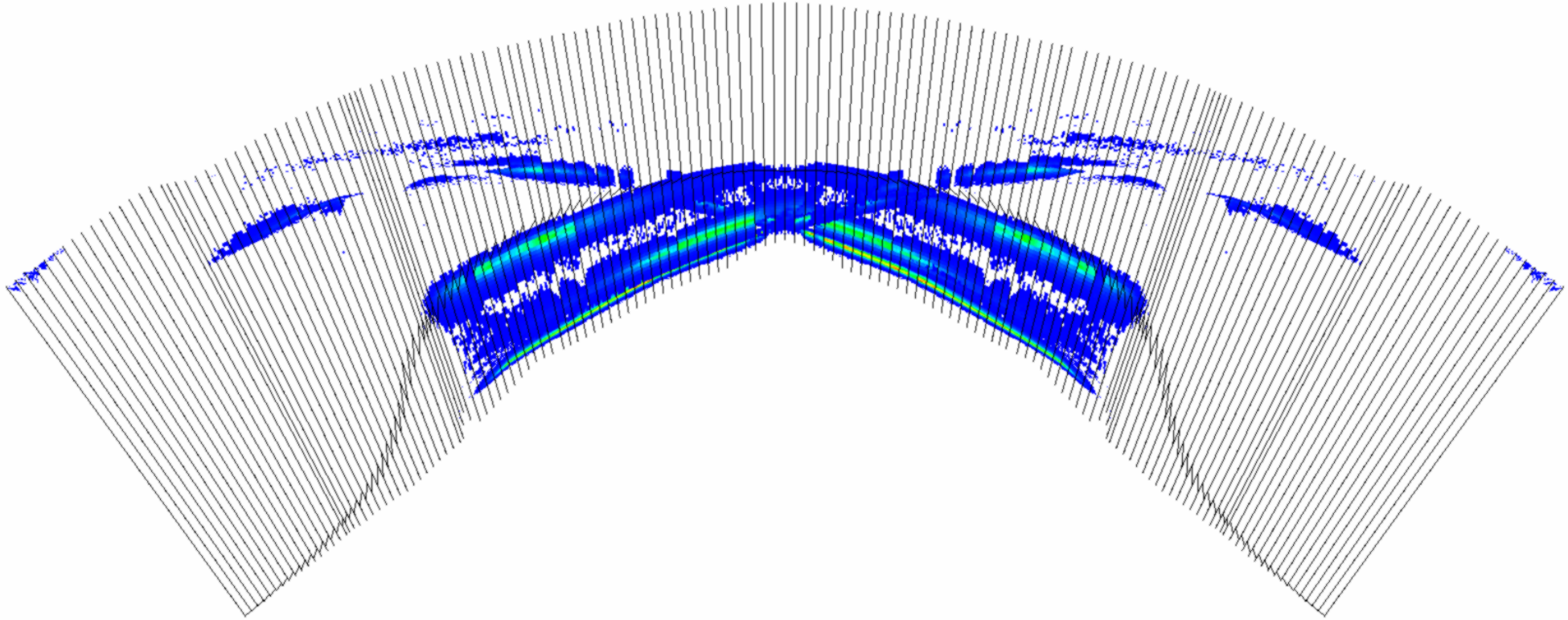
Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 0 kA



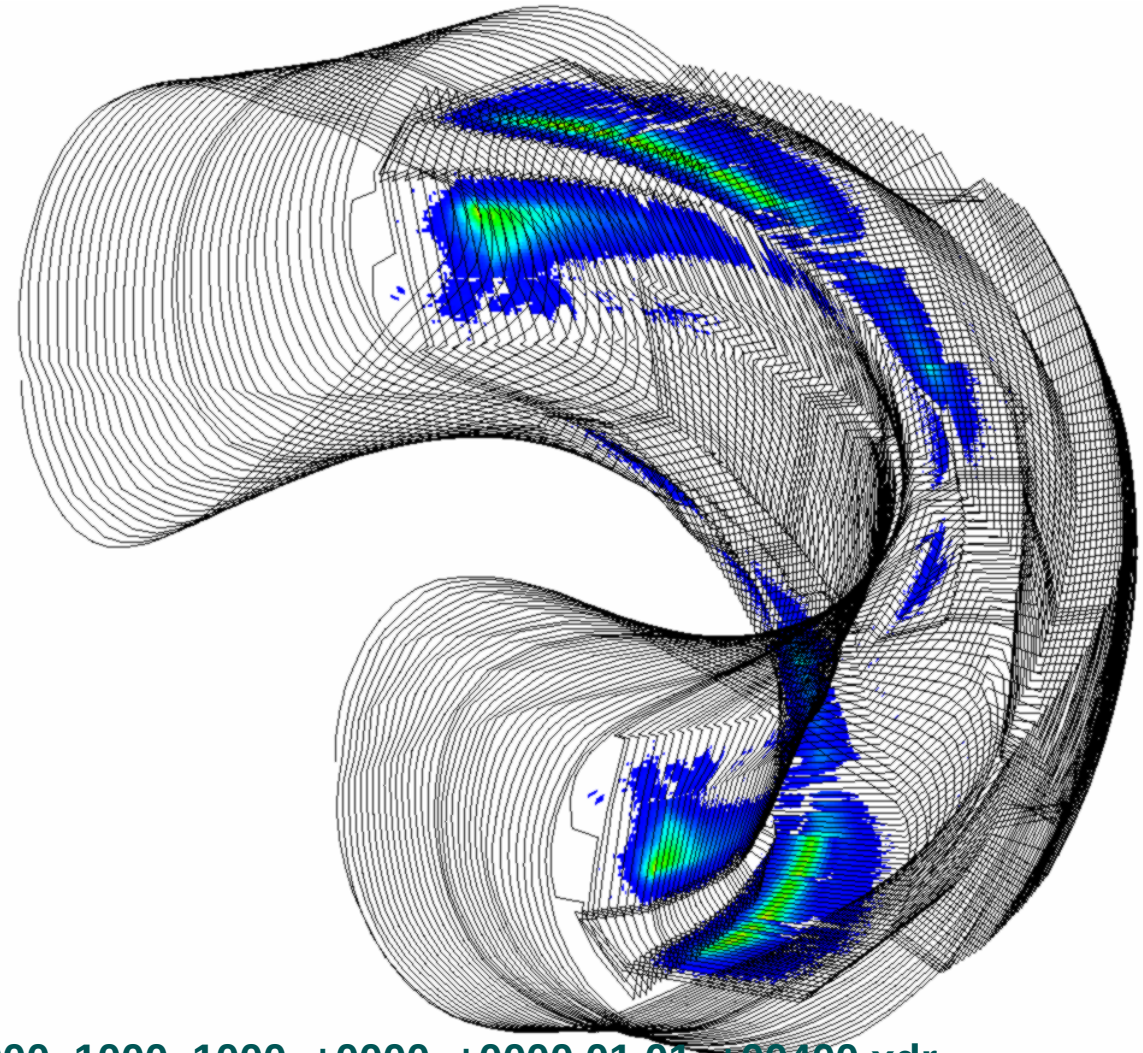
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15ss

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 0 kA



fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15ss

Originalgeometrie, Standard, Beta = 0,16 %, Itor = 4 kA



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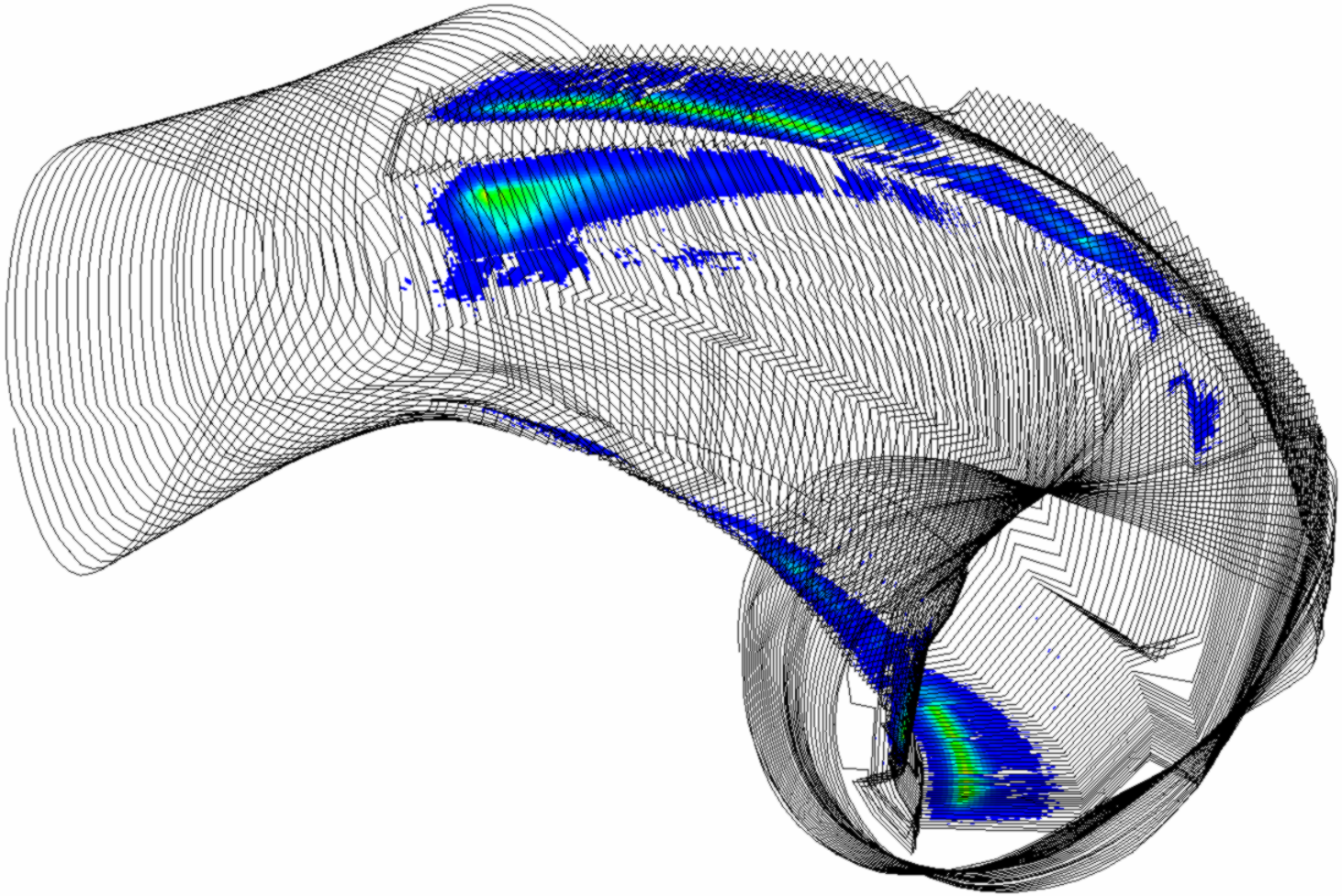
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 4 kA



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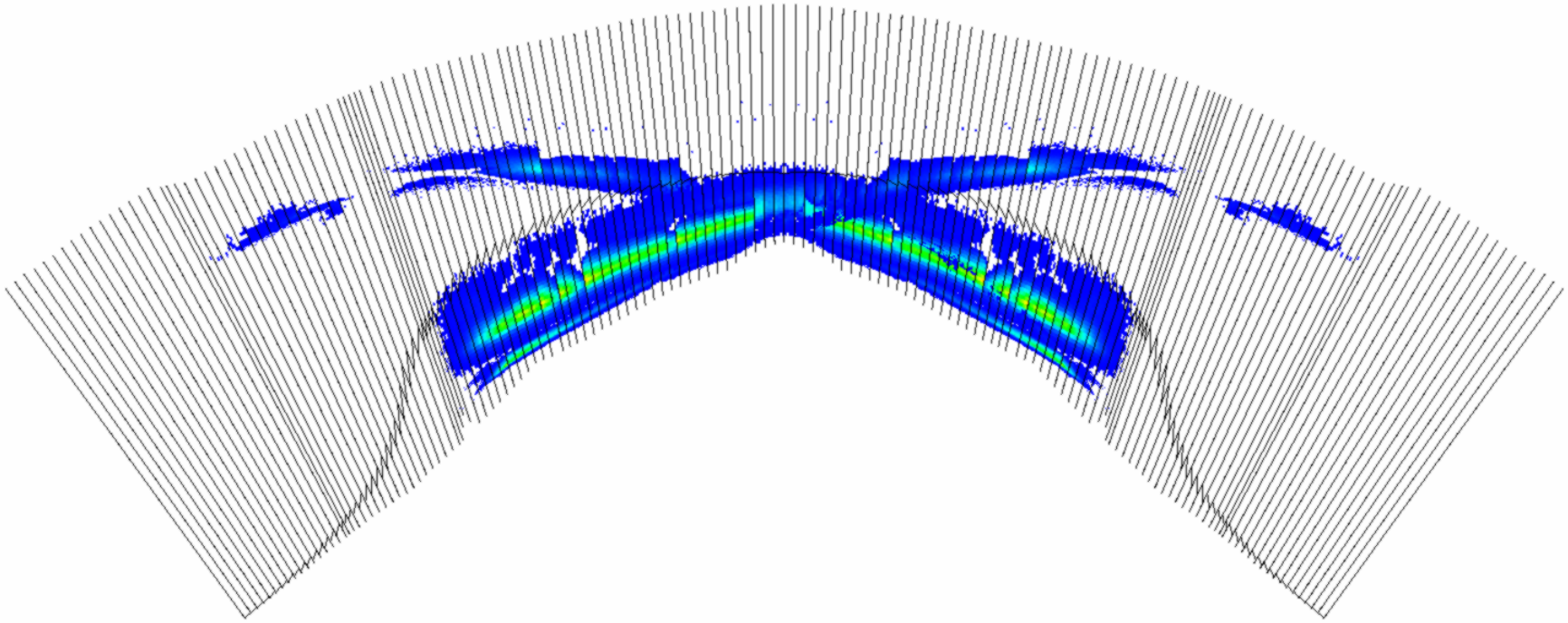
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 4 kA



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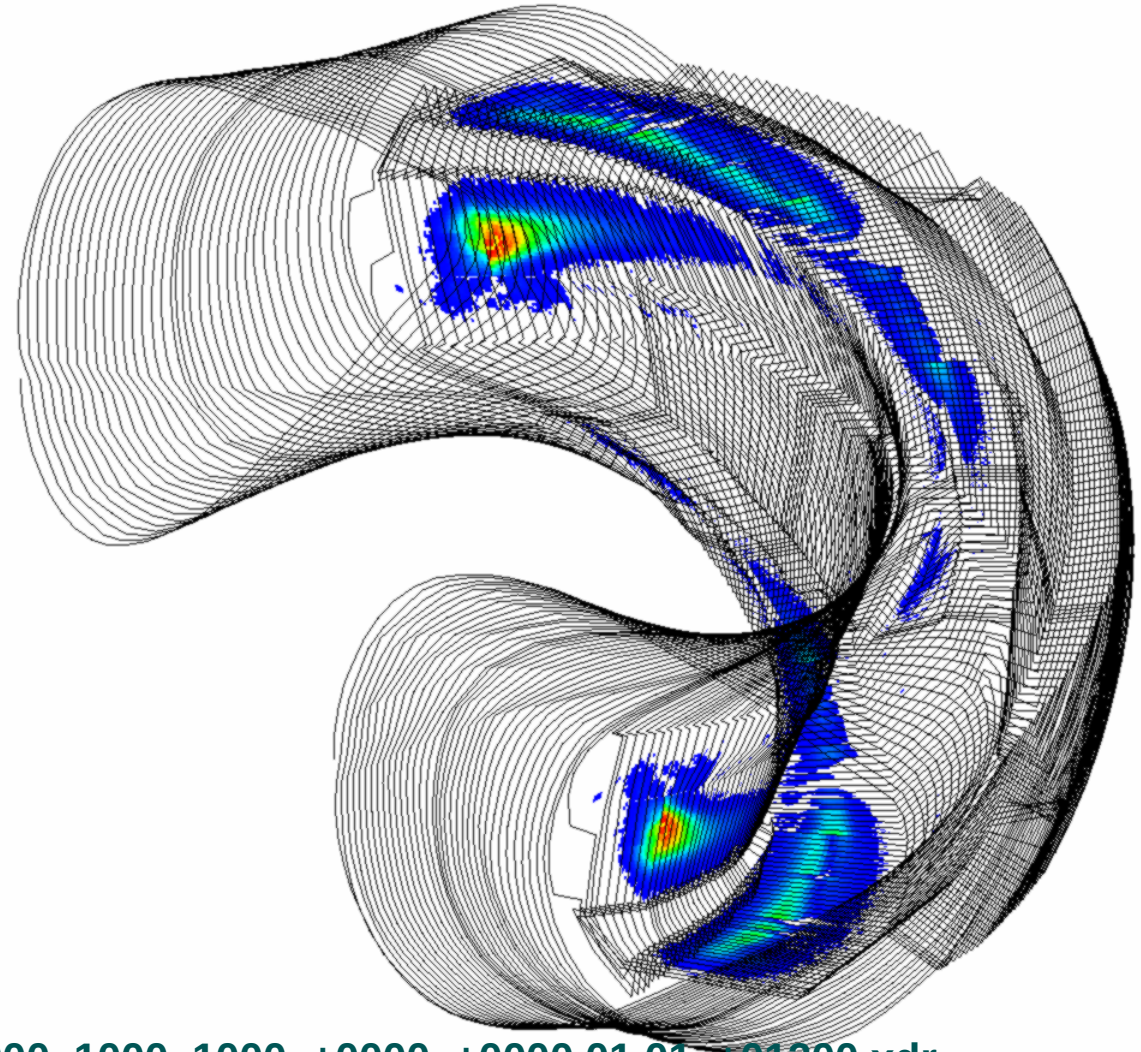
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 12 kA



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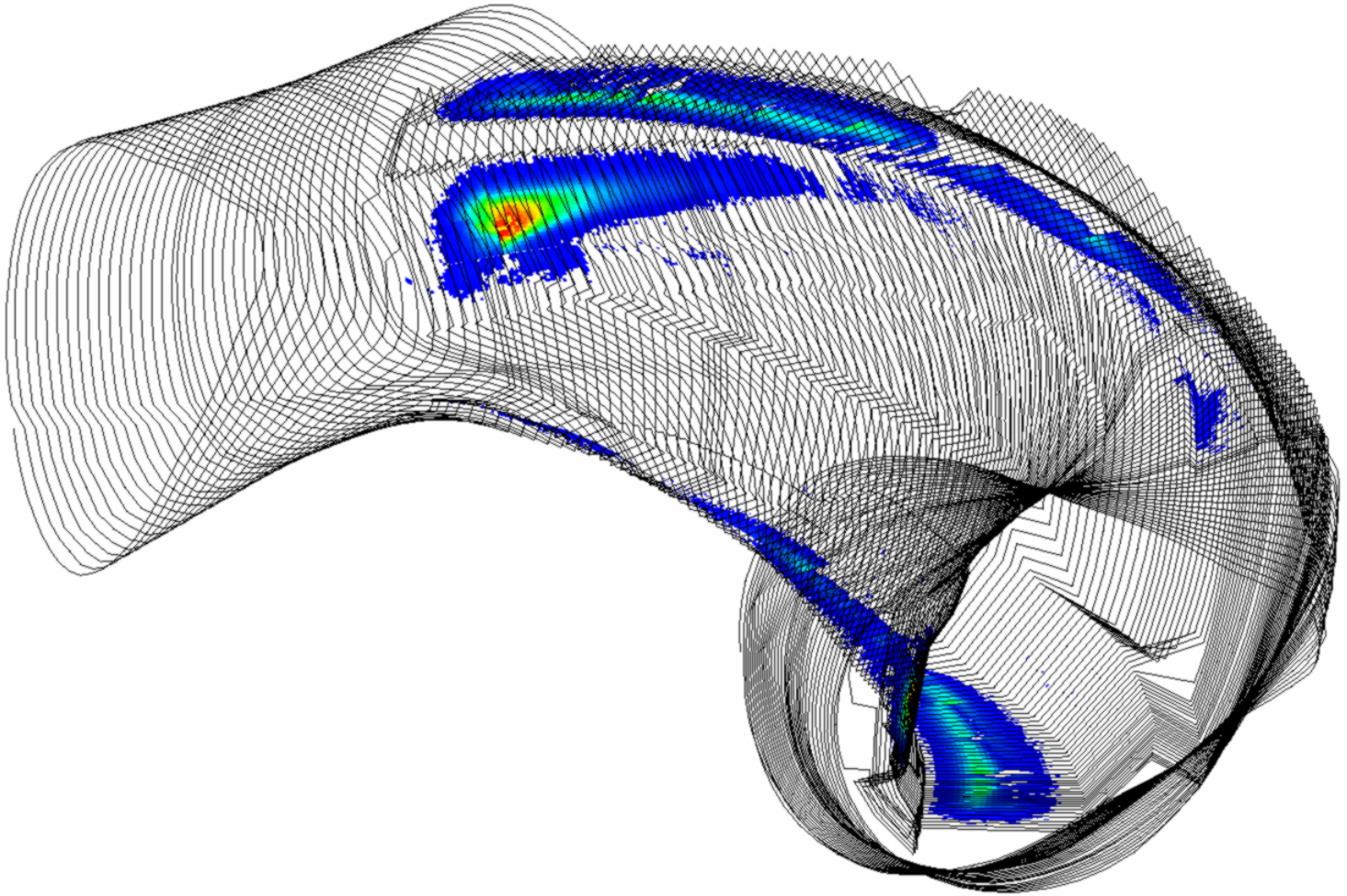
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 12 kA



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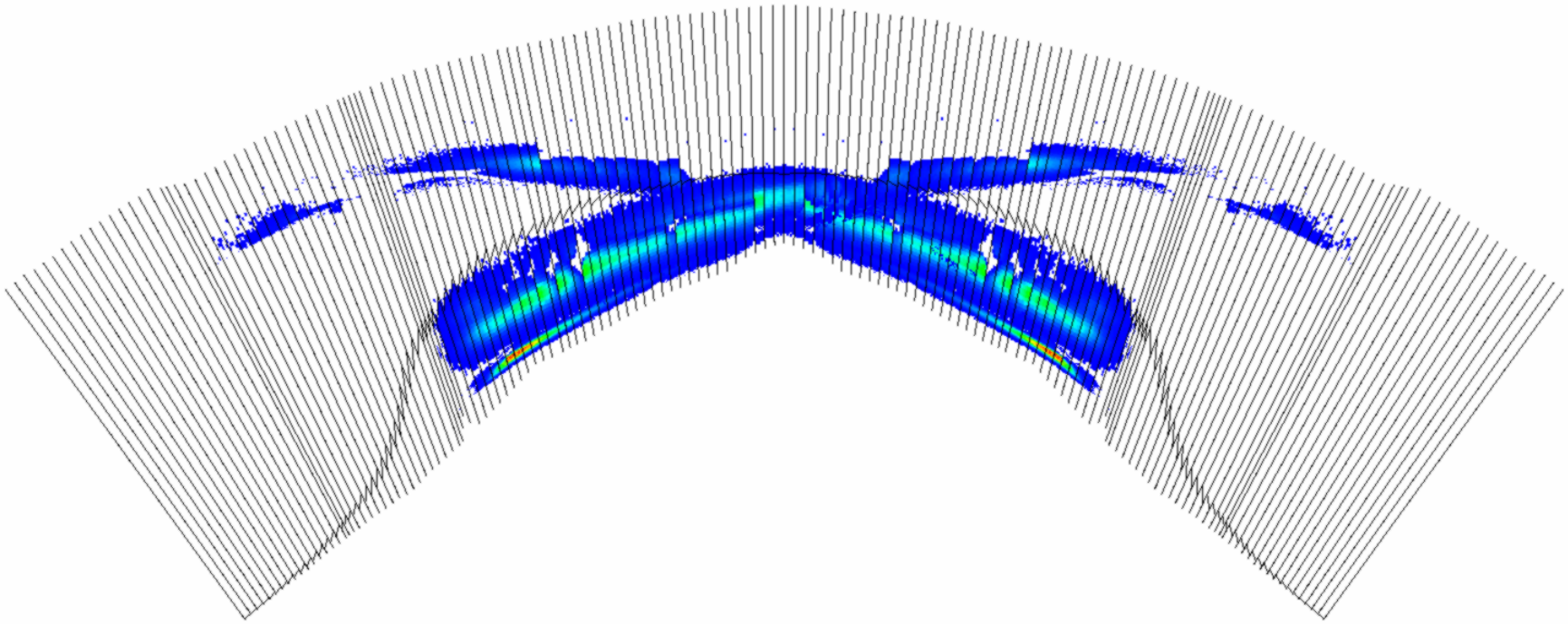
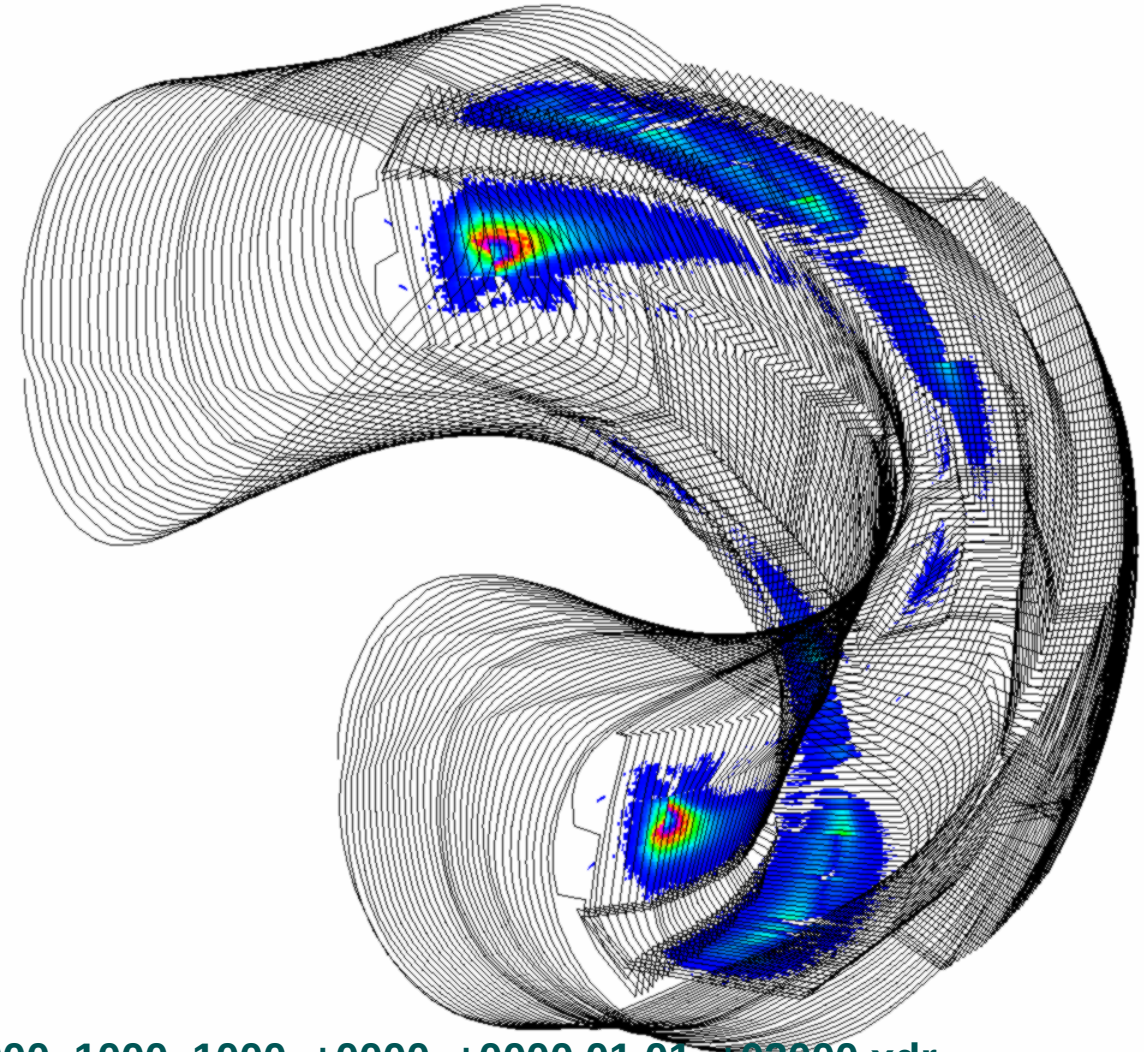
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 12 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_+01200.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = 20 kA



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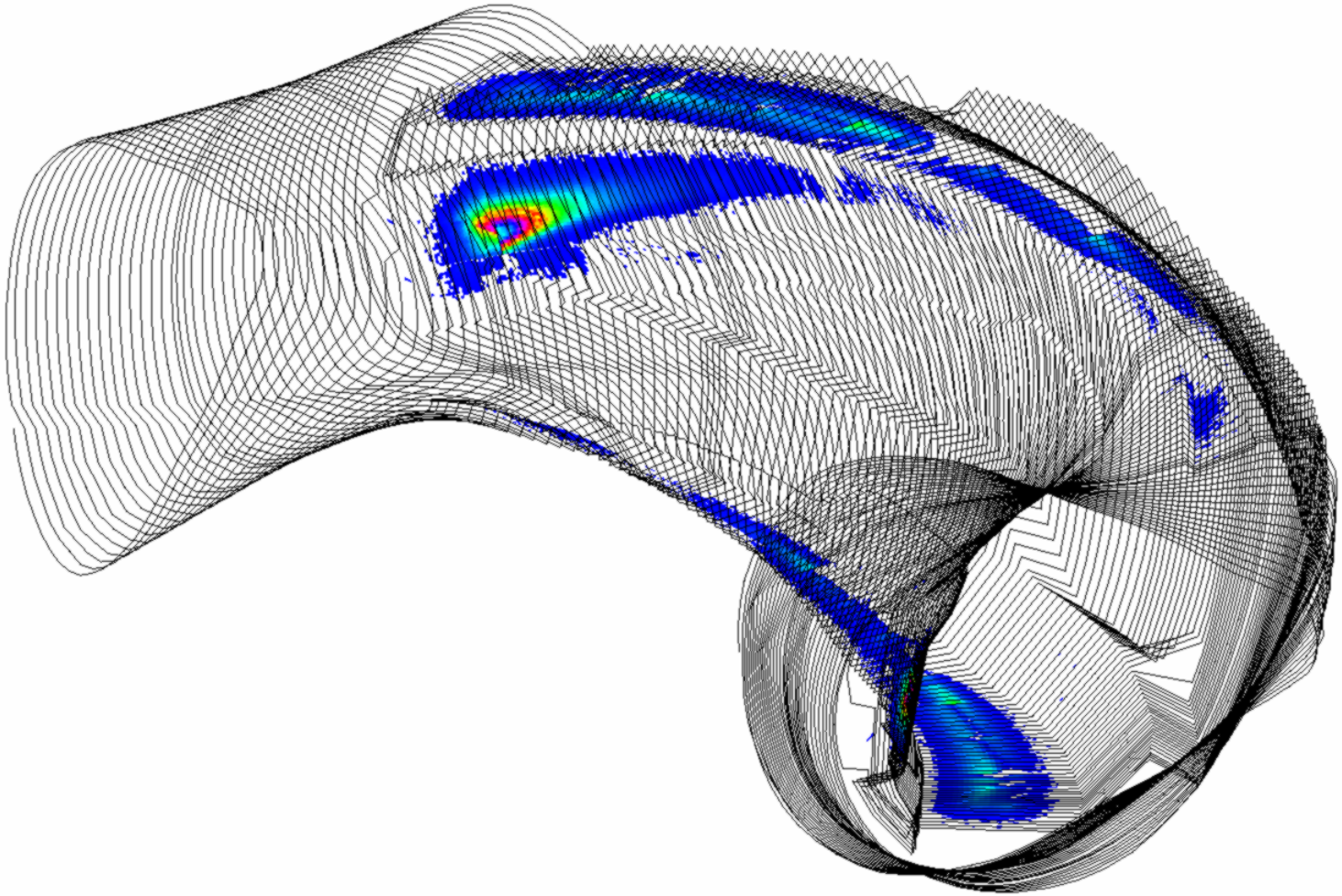
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 20 kA



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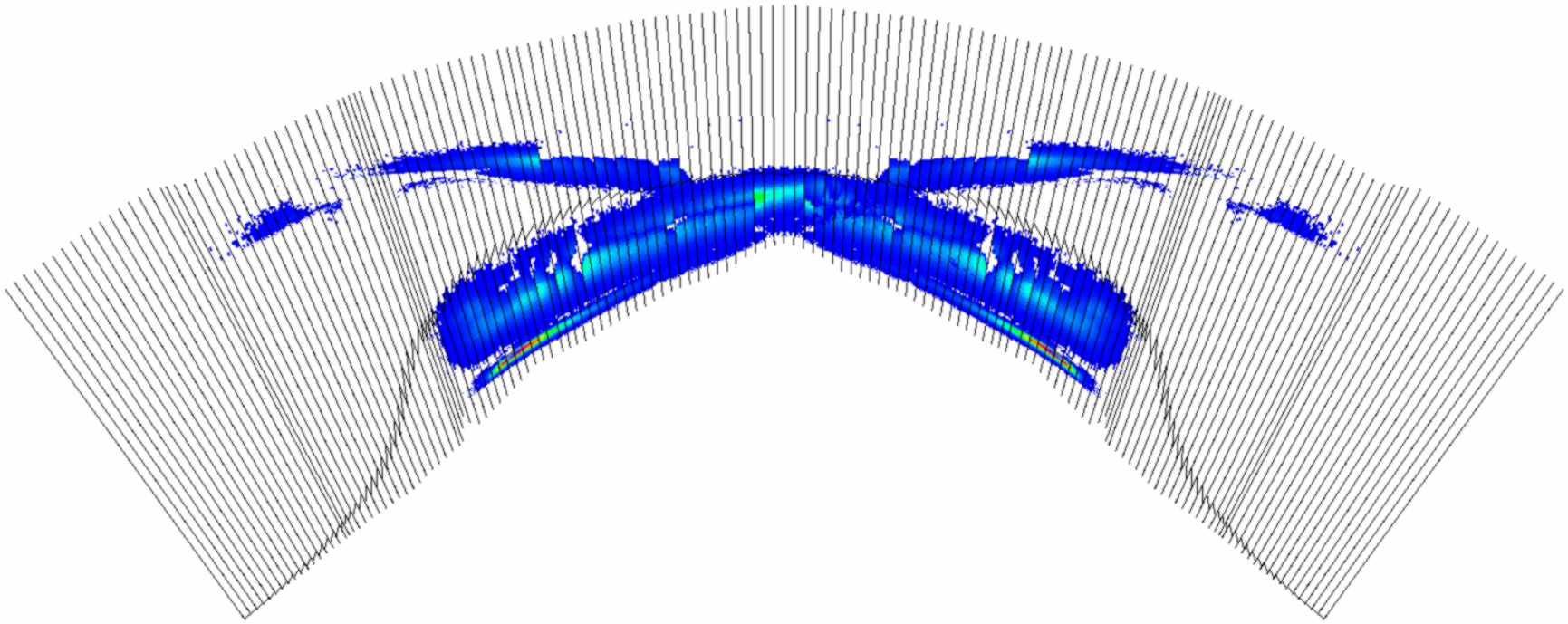
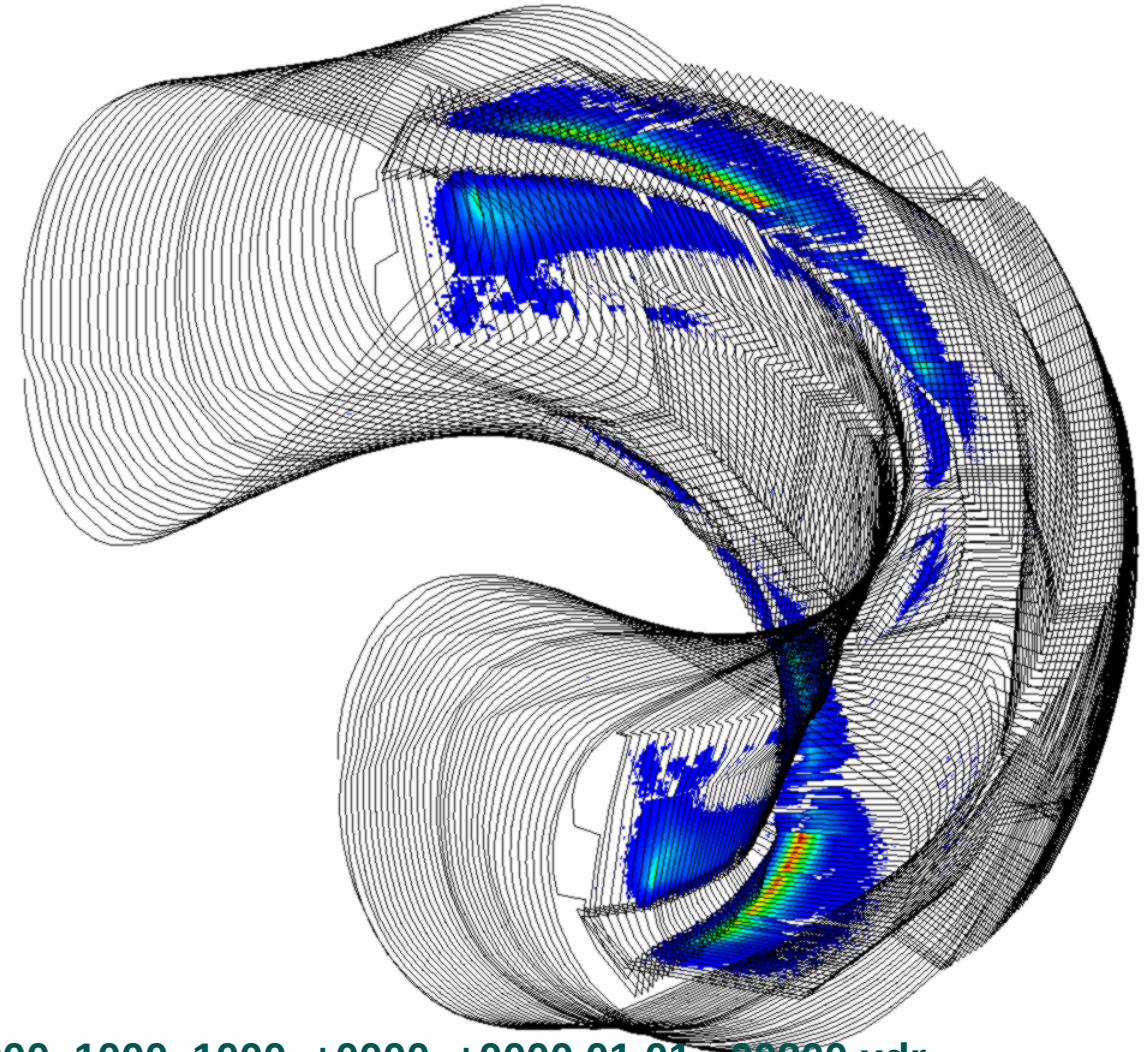
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 20 kA



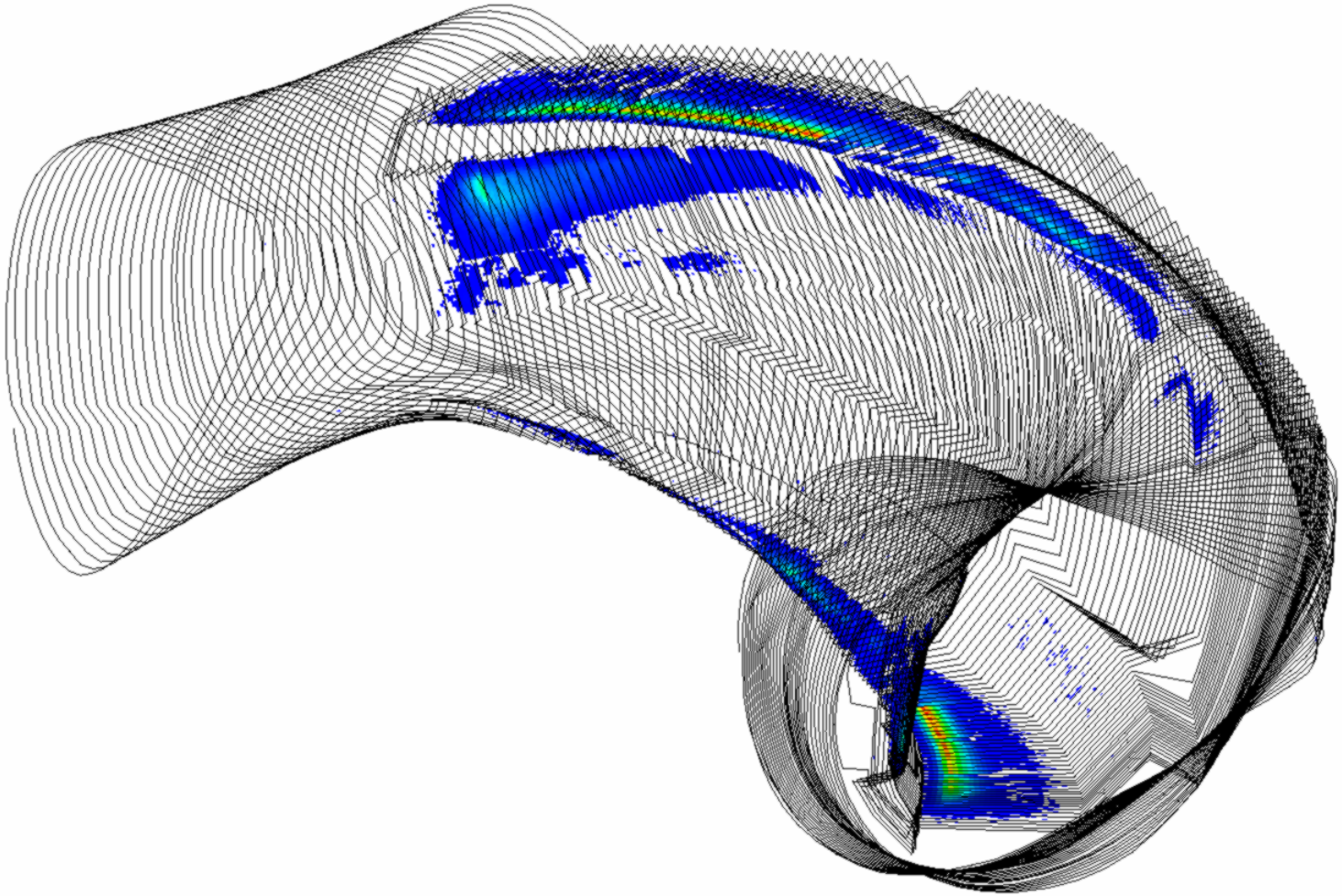
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_+02000.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = -8 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_-00800.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = -8 kA



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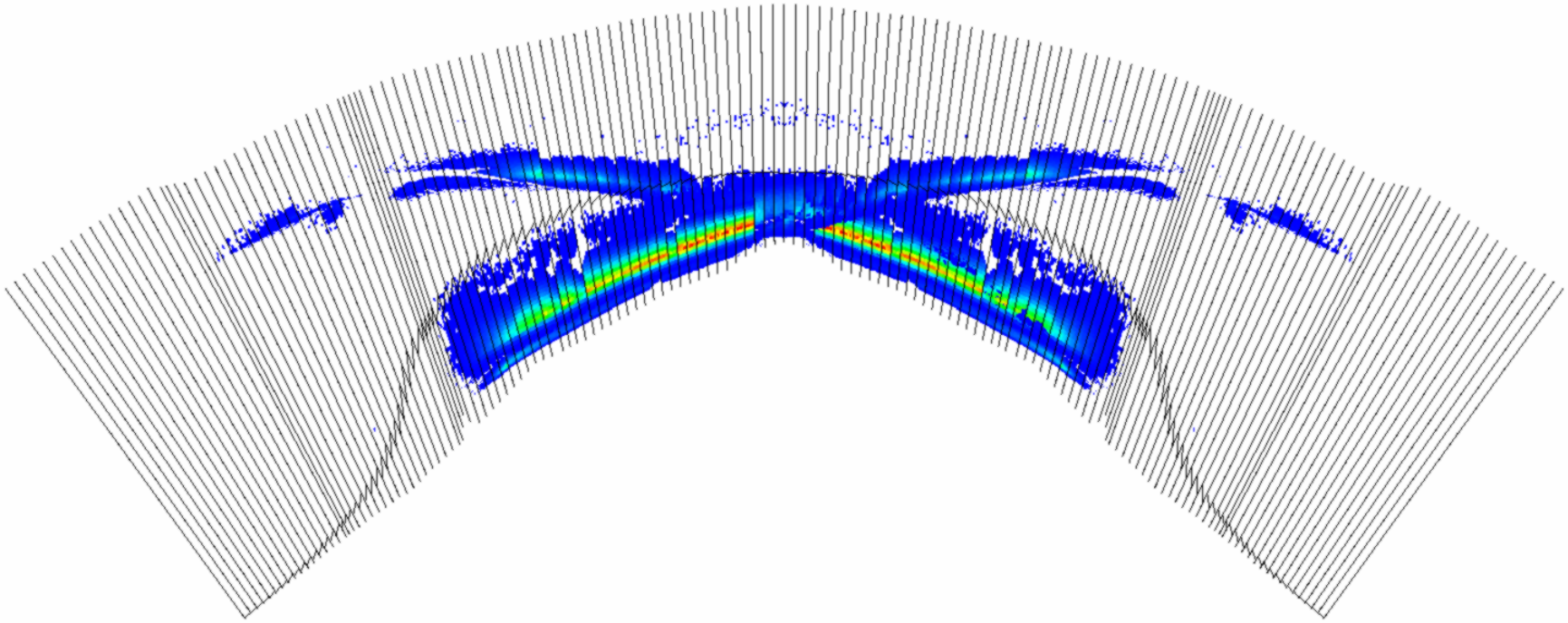
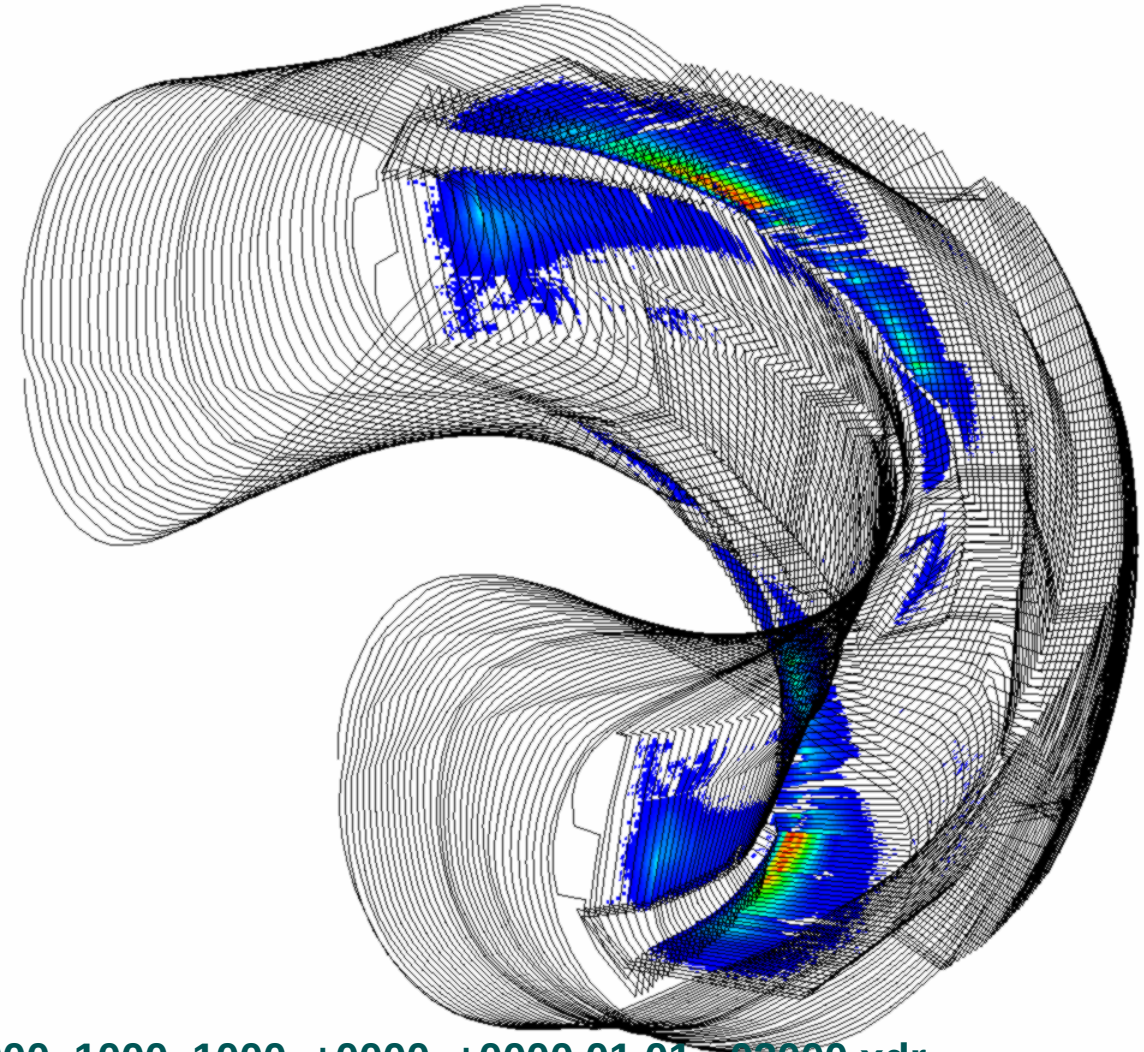
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -8 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_-00800.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = -20 kA



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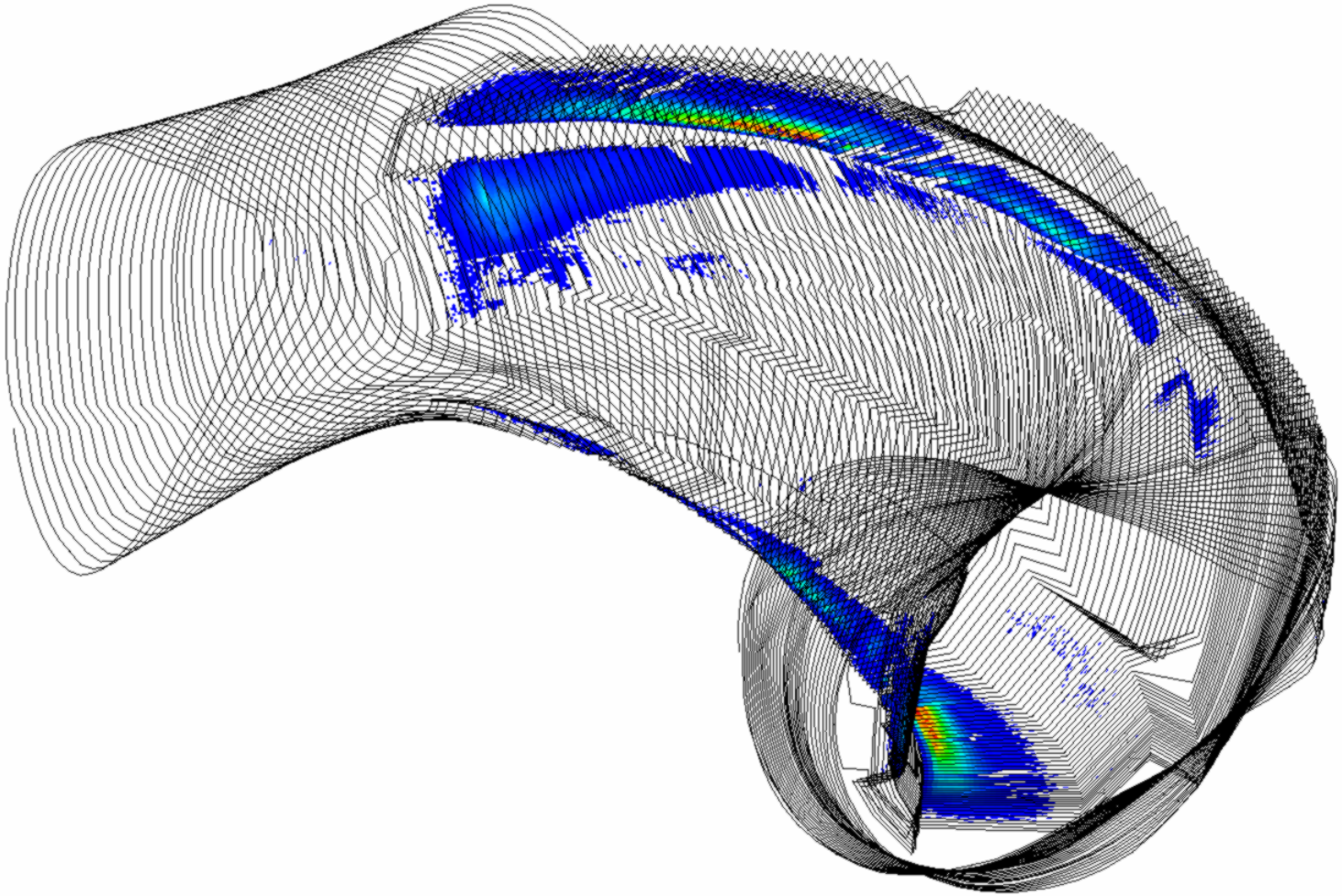
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -20 kA



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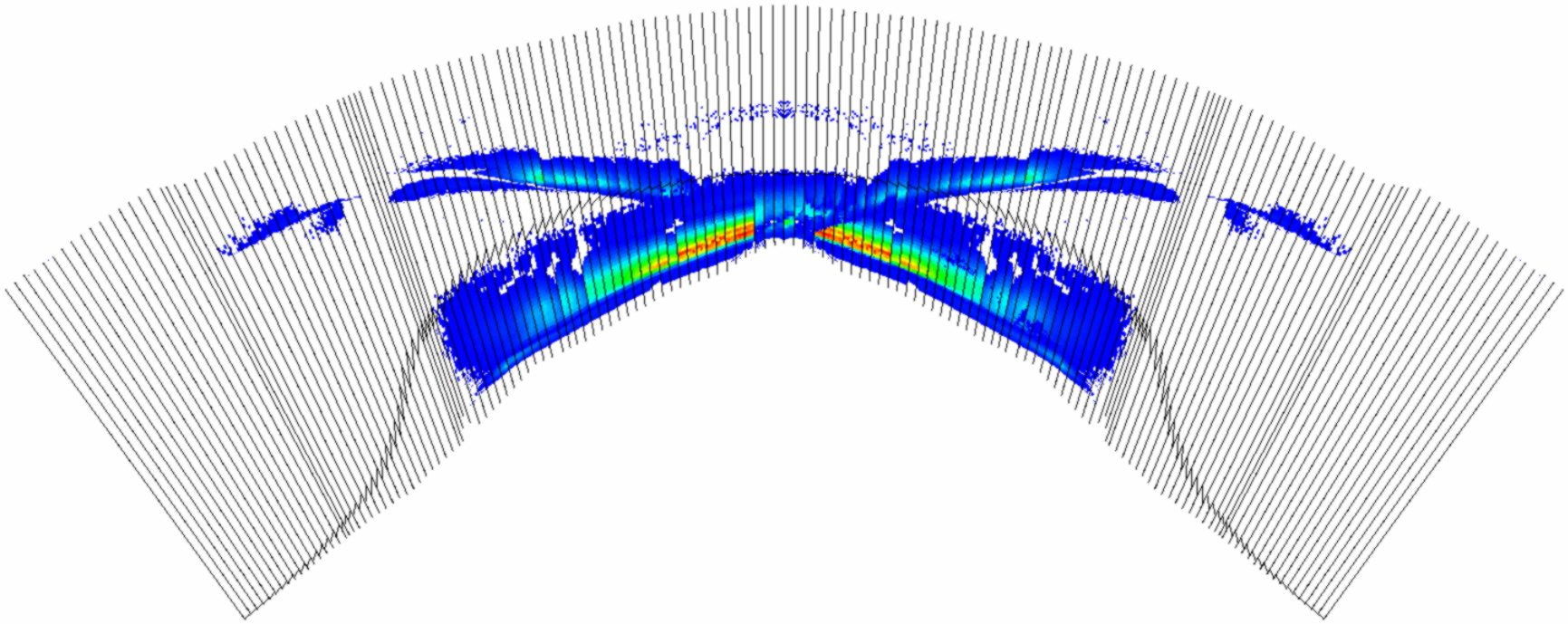
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -20 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_-02000.xdr

Changes in heat load pattern with varied Itor

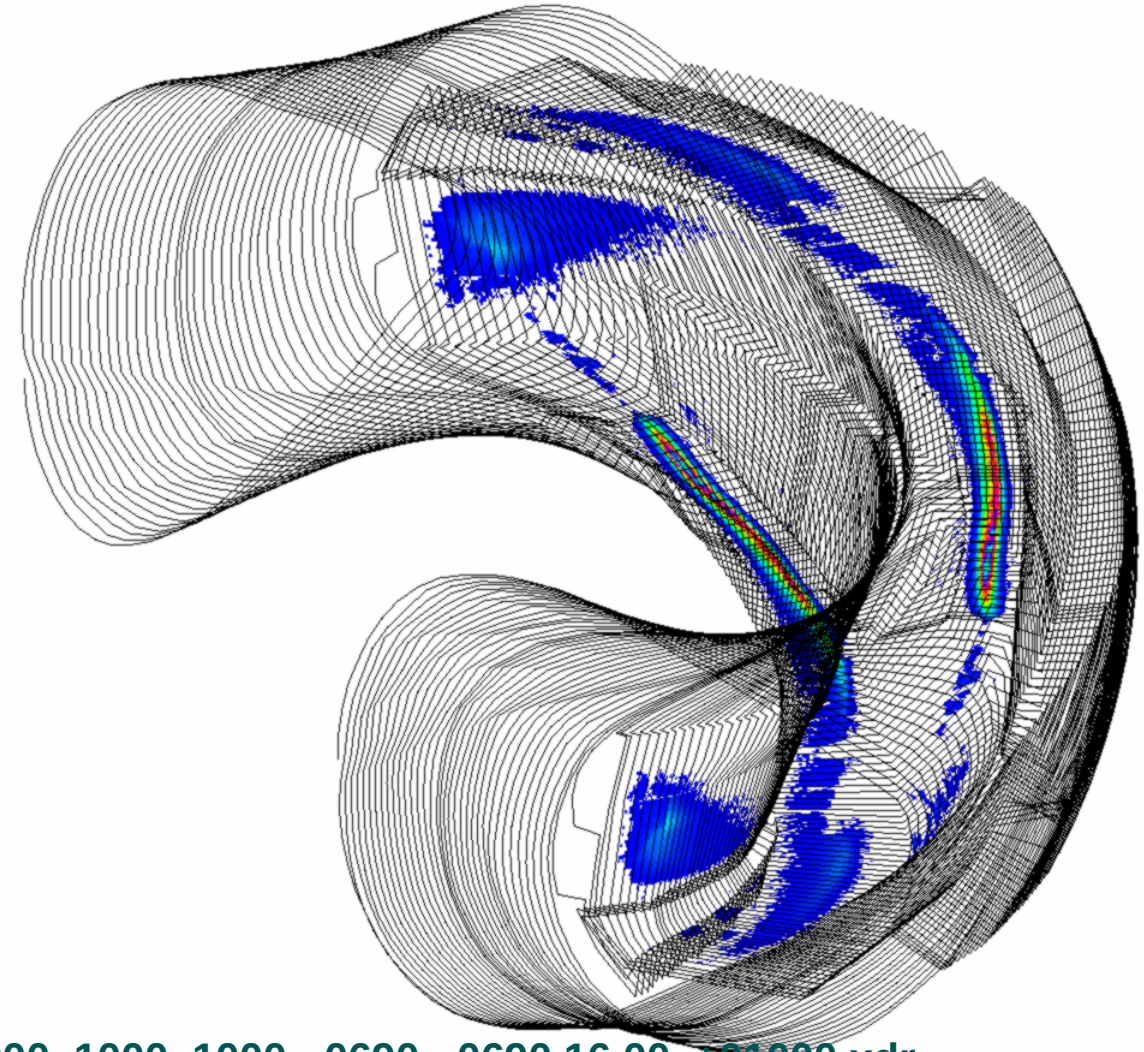
Standard, Beta = 0,16%: with increasing Itor (positive) loads on the vertical target increase, with increasing Itor (negative) loads on the vertical target decrease, strike line on horizontal target shows increased load. In the range of -10 to -20kA the strike line on TMh moves towards the pumping gap.

High Iota, Beta = 0%: with increasing Itor (positive) loads on the vertical target decrease, resulting in higher loads on the horizontal part, the strike line becomes slightly broader.

With increasing Itor (negative) a redistribution of the loads from the horizontal to the vertical targets appears. Opposite to the standard configuration.

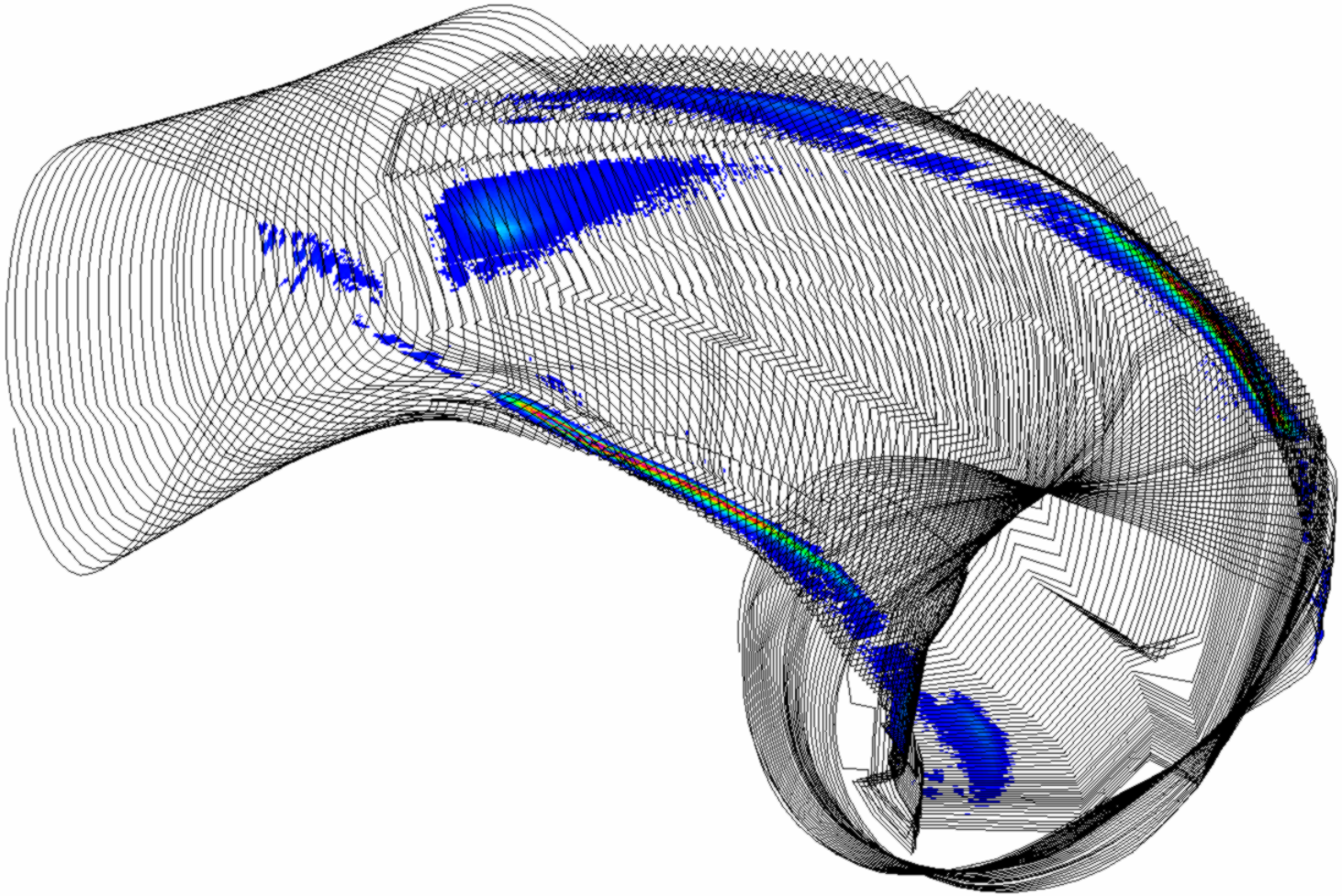
High Mirror, Beta = 0%: almost identical effects like in standard configuration.

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = 10 kA



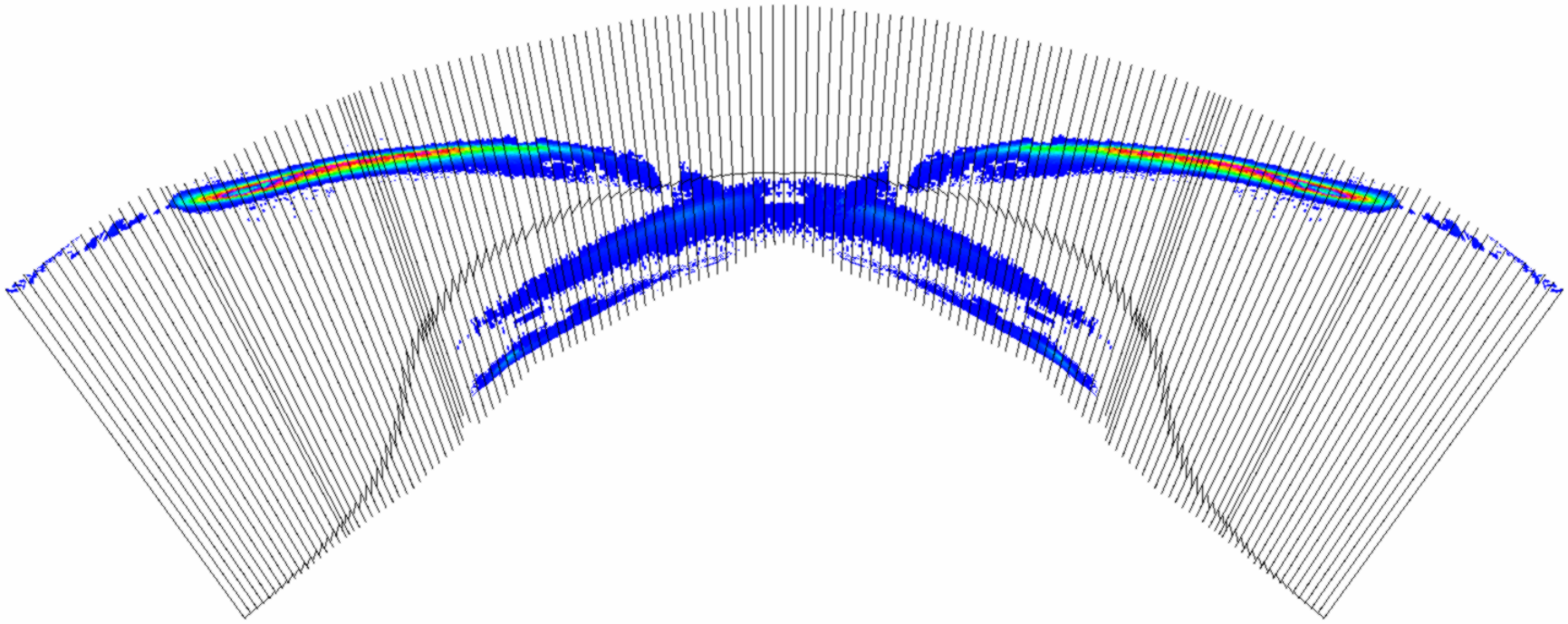
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_+01000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = 10 kA



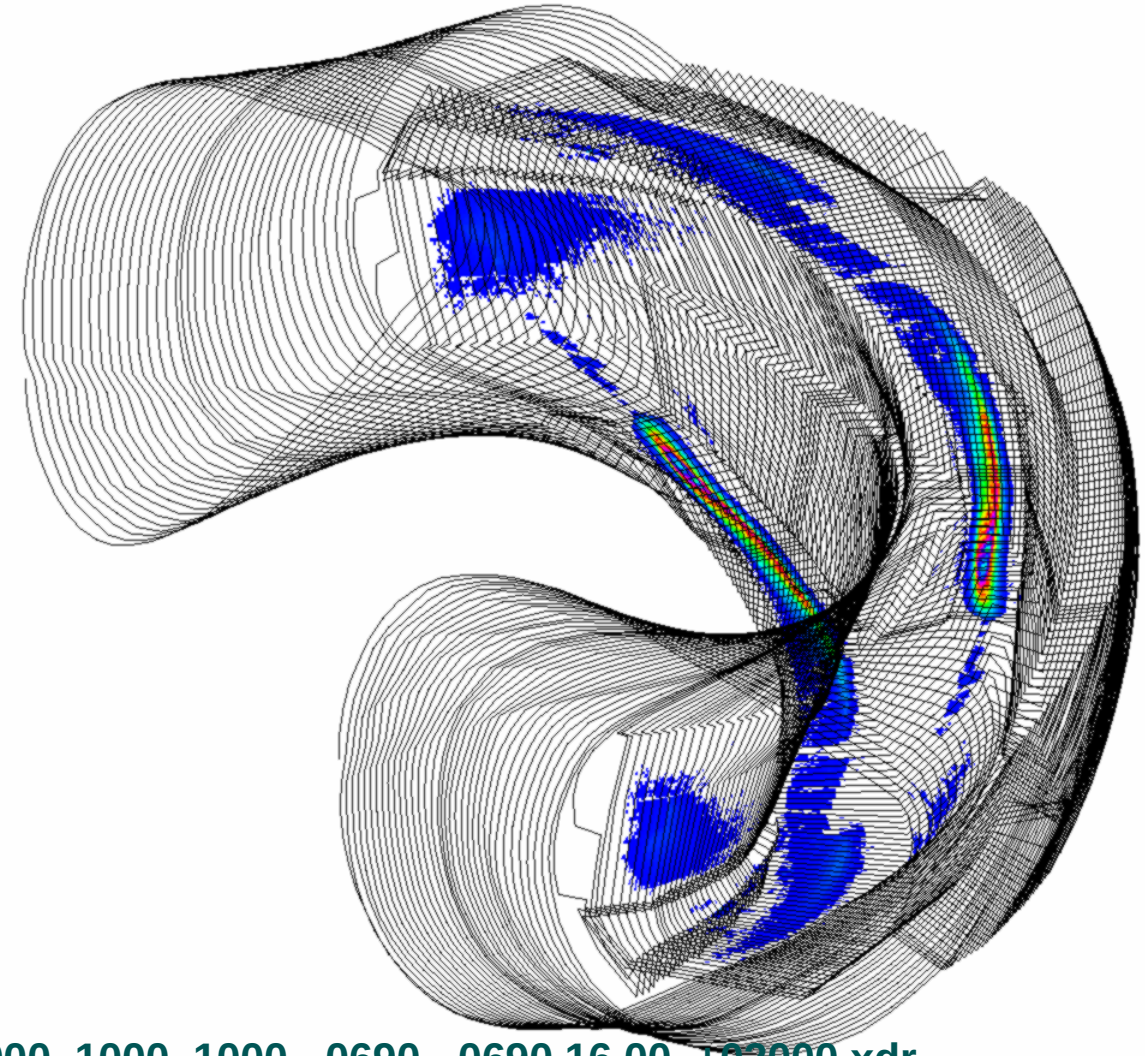
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_+01000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = 10 kA



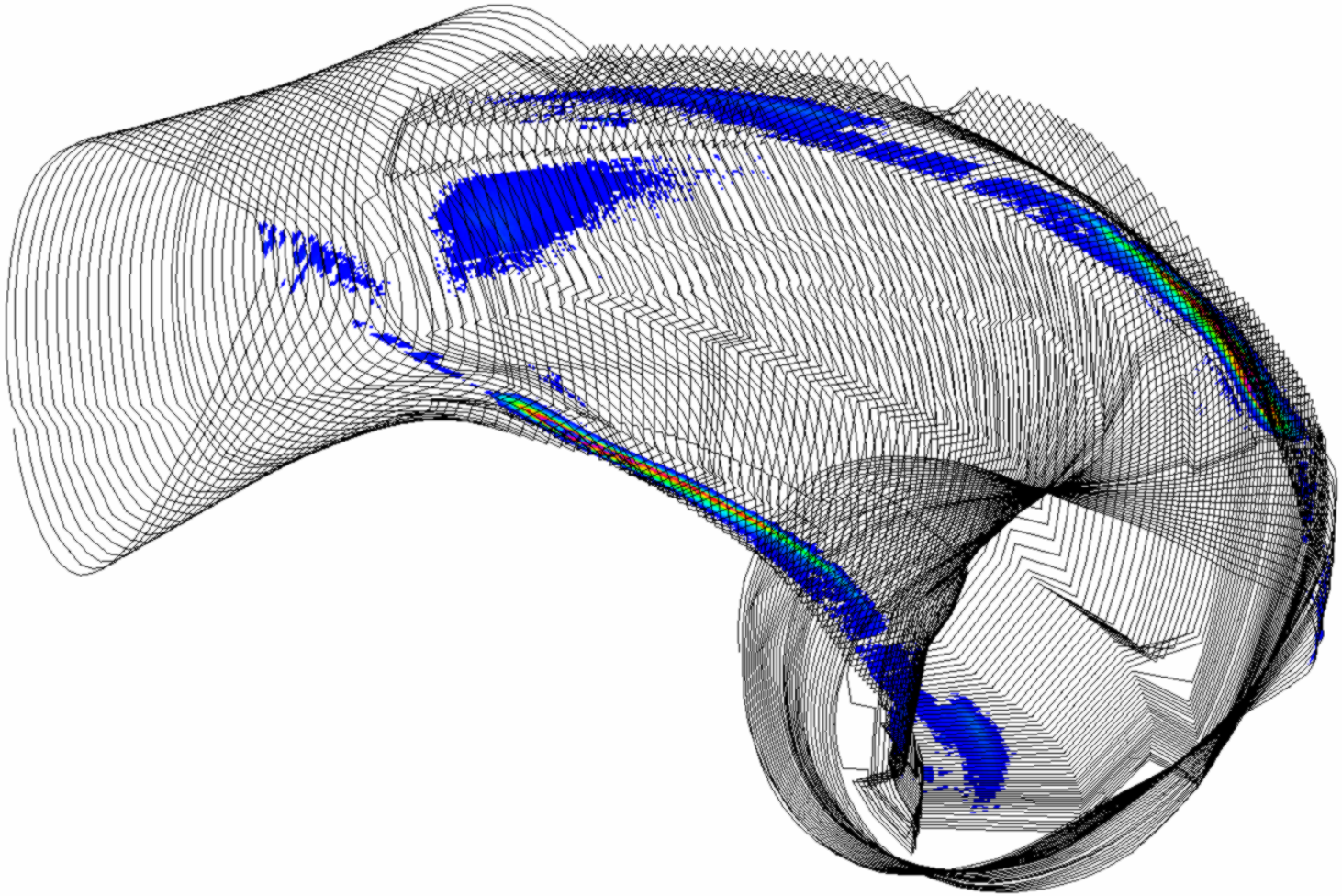
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_+01000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = 20 kA



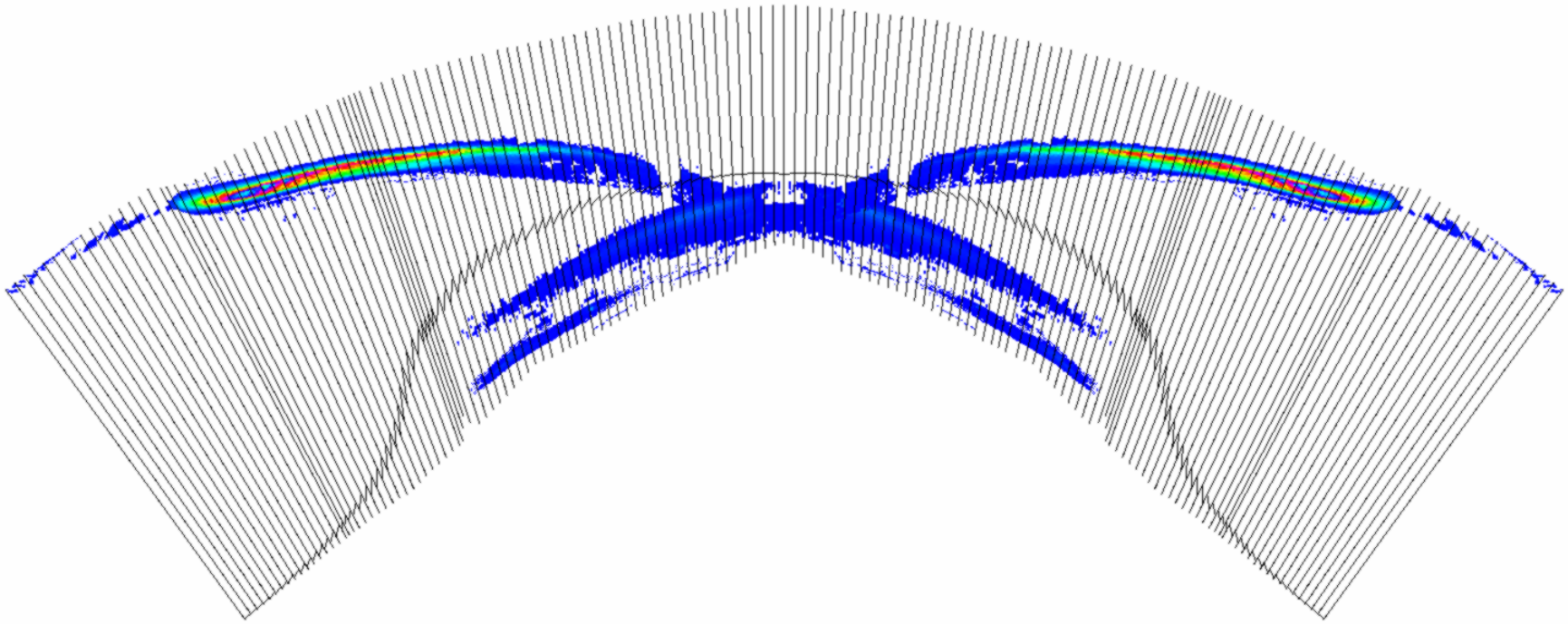
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_+02000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = 20 kA



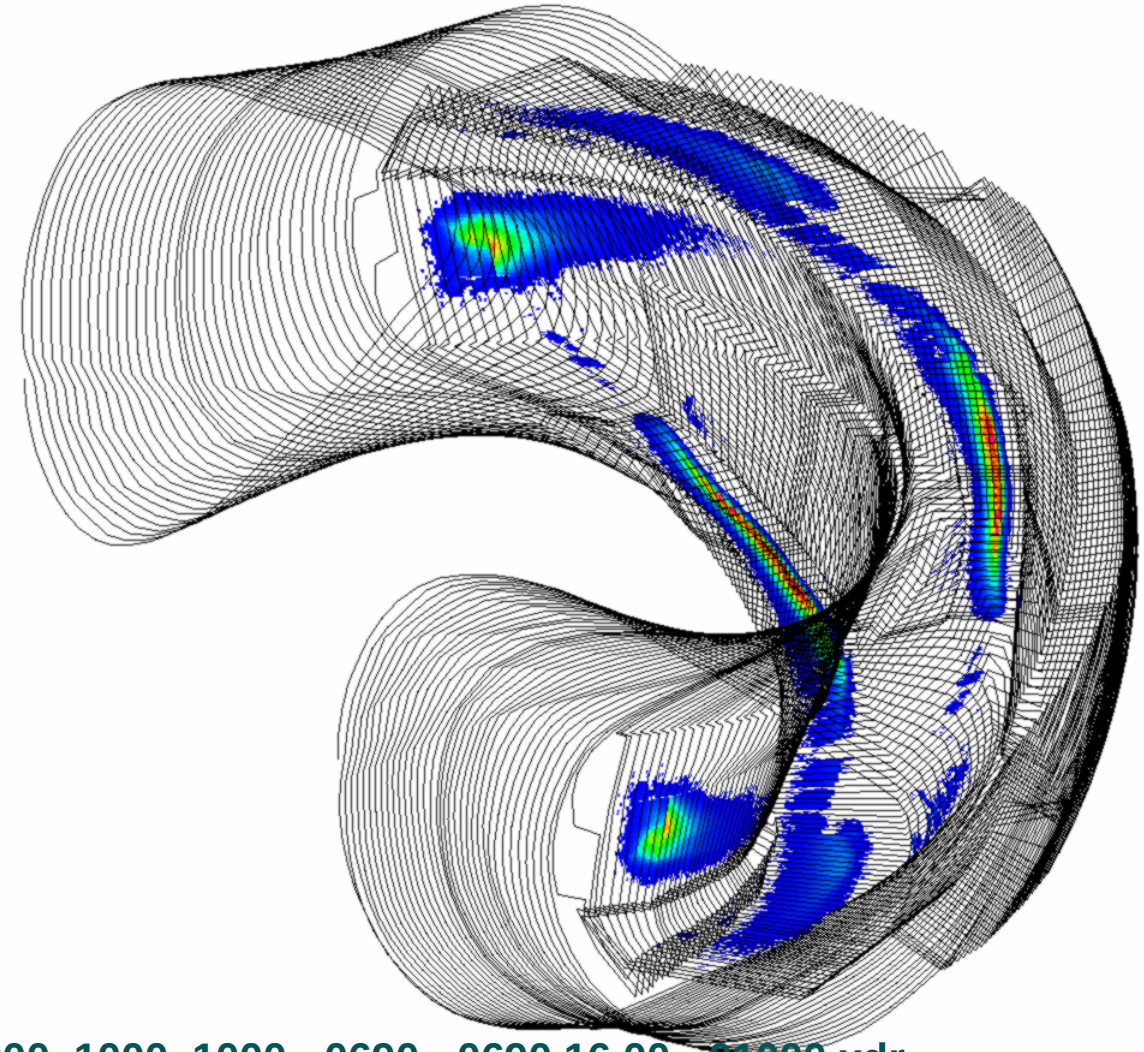
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_+02000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = 20 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_+02000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = -10 kA



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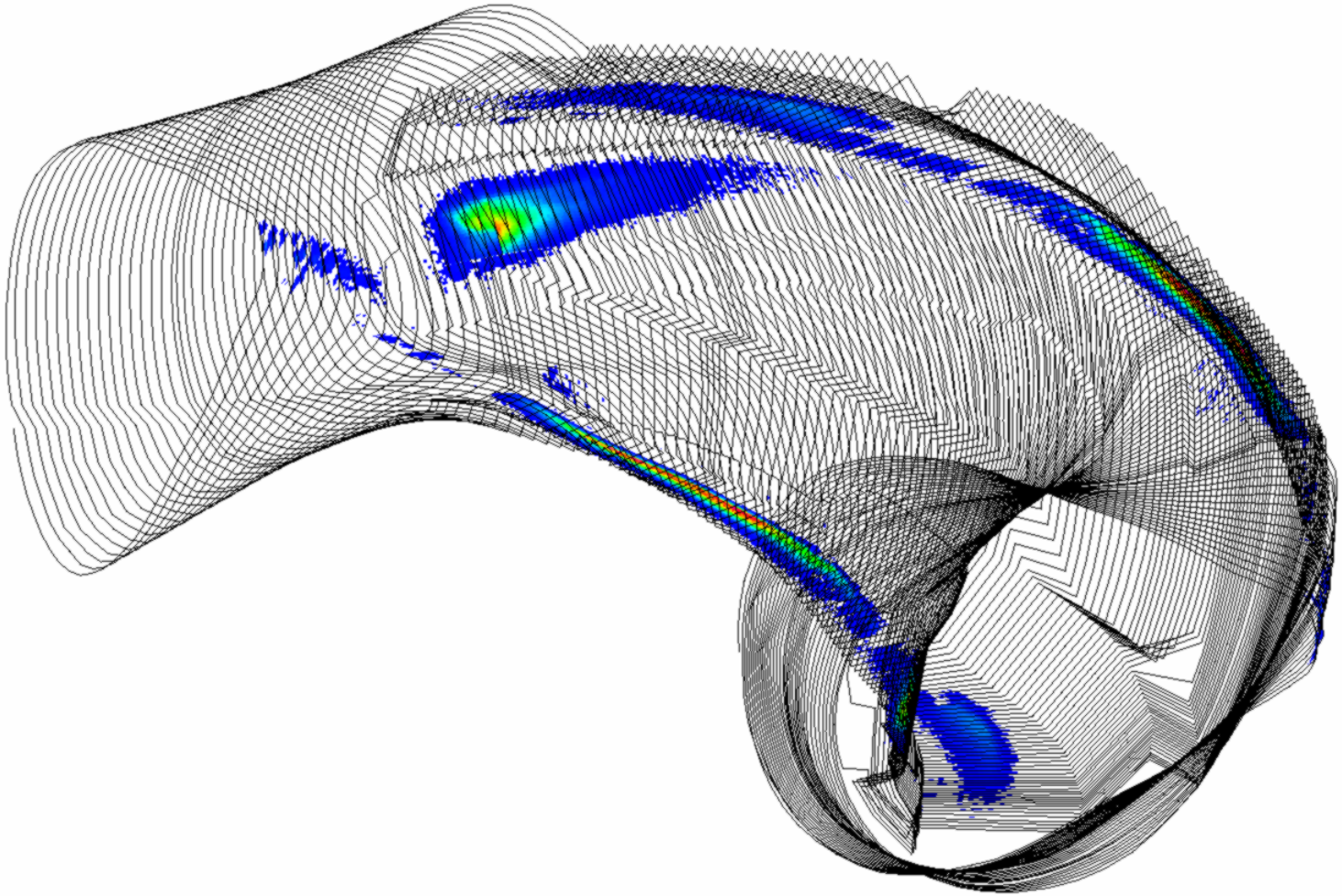
Originalgeometrie, High Iota, Beta = 0,0 %, Itor = -10 kA



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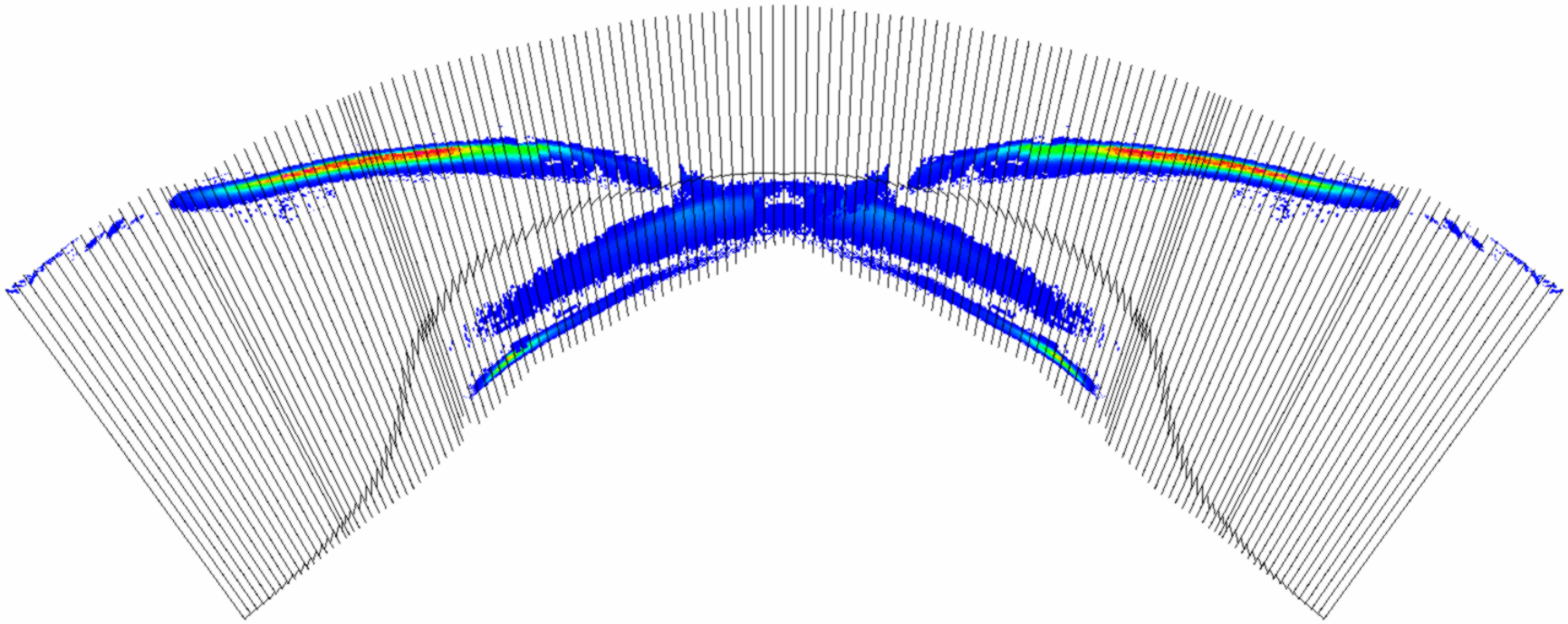
Originalgeometrie, High Iota, Beta = 0,0 %, Itor = -10 kA



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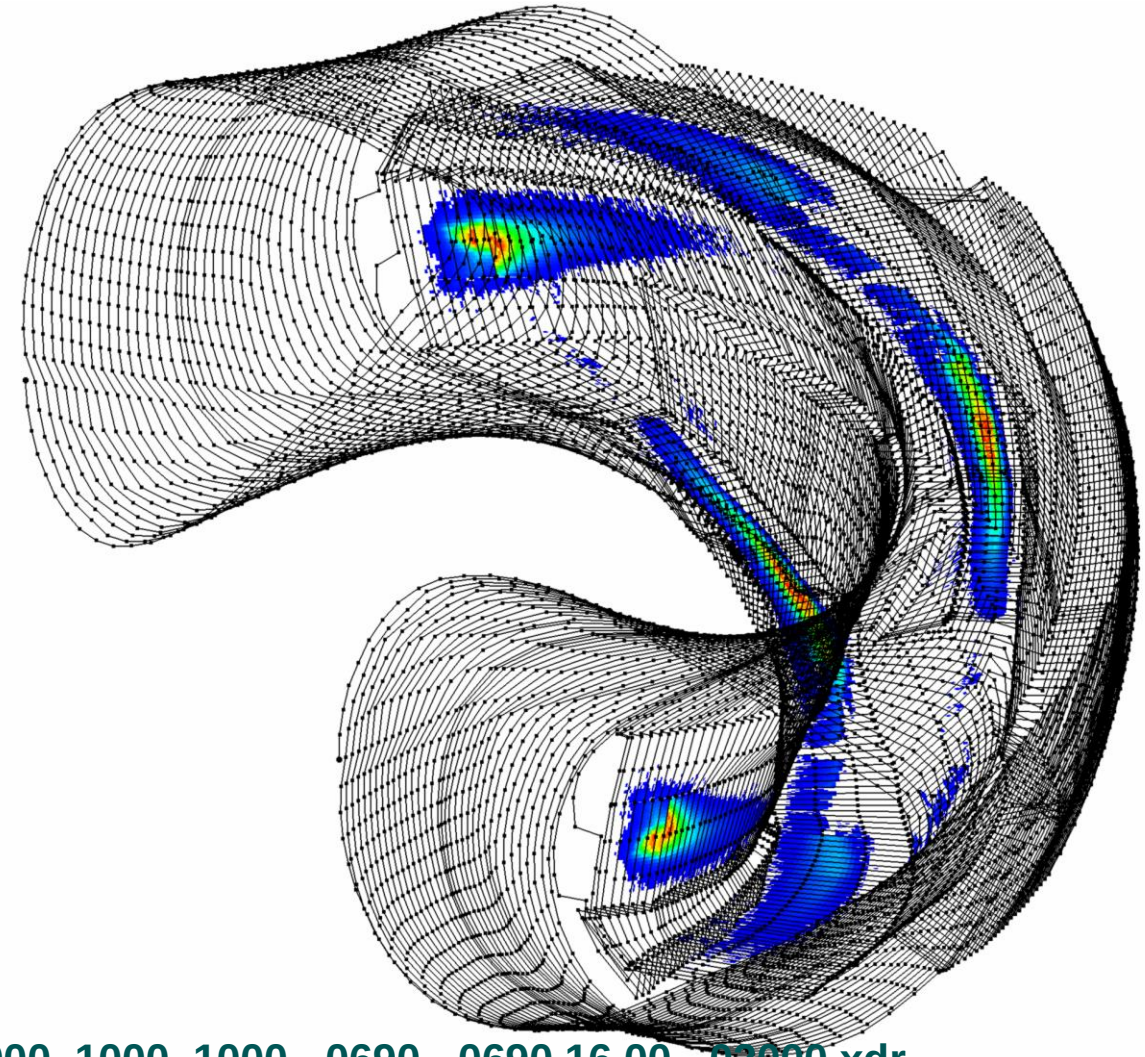
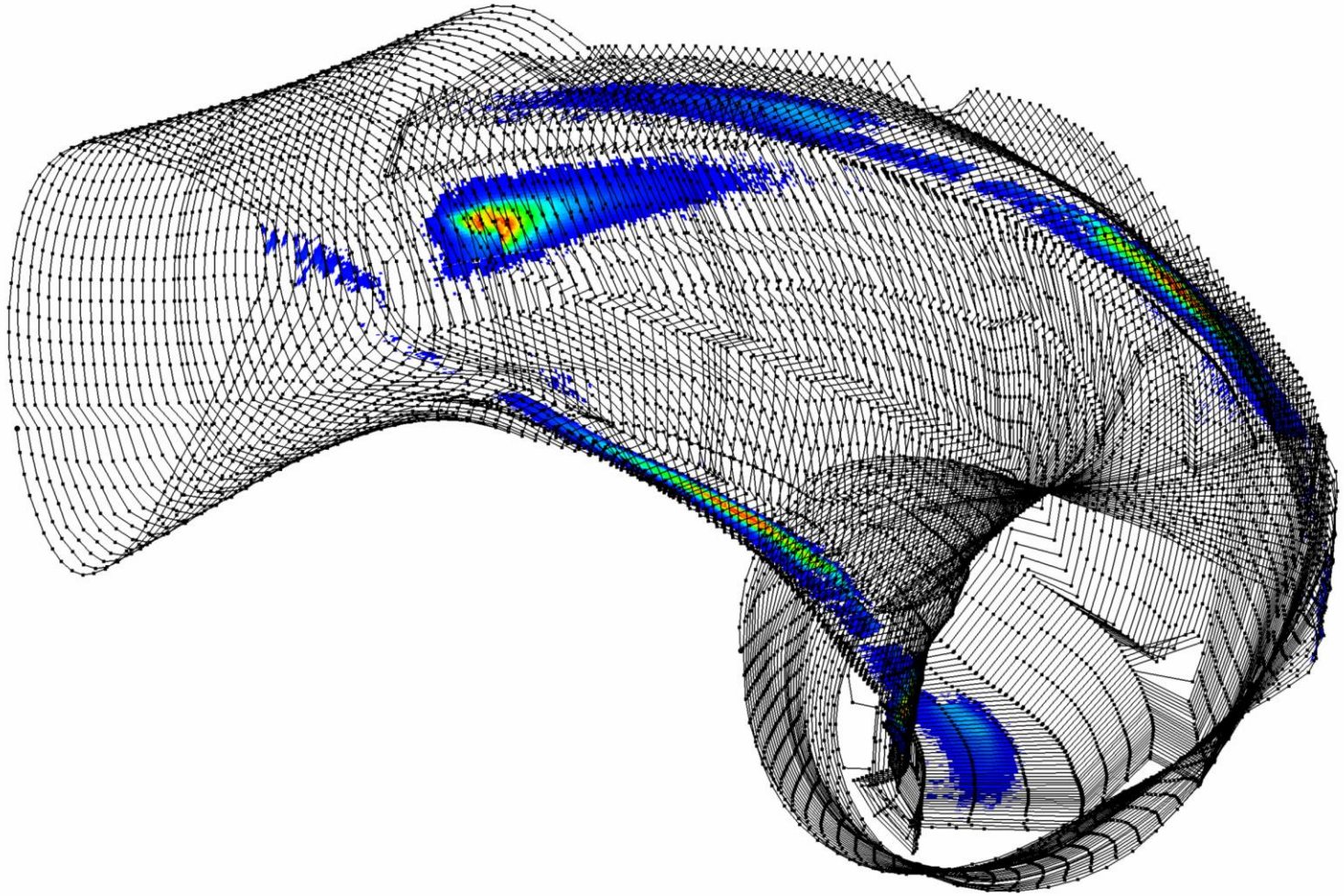
Originalgeometrie, High Iota, Beta = 0,0 %, Itor = -20 kA



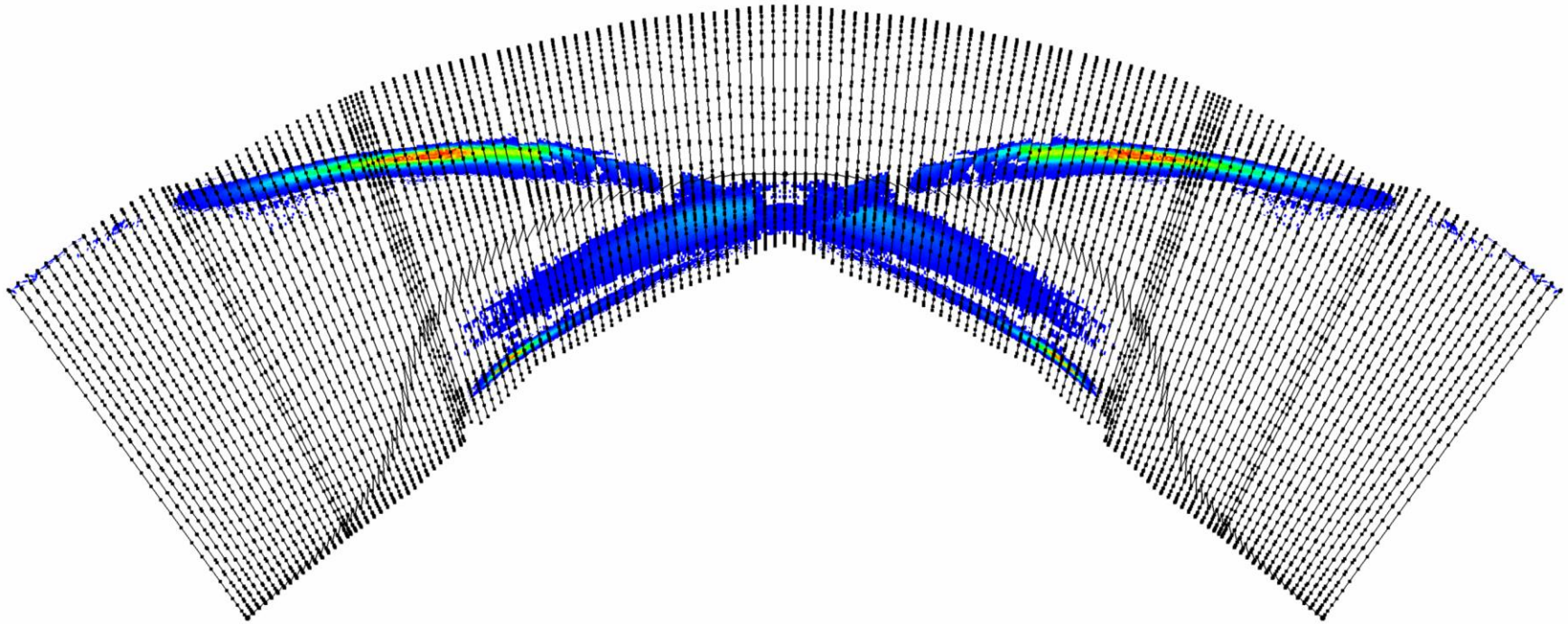
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_-02000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = -20 kA



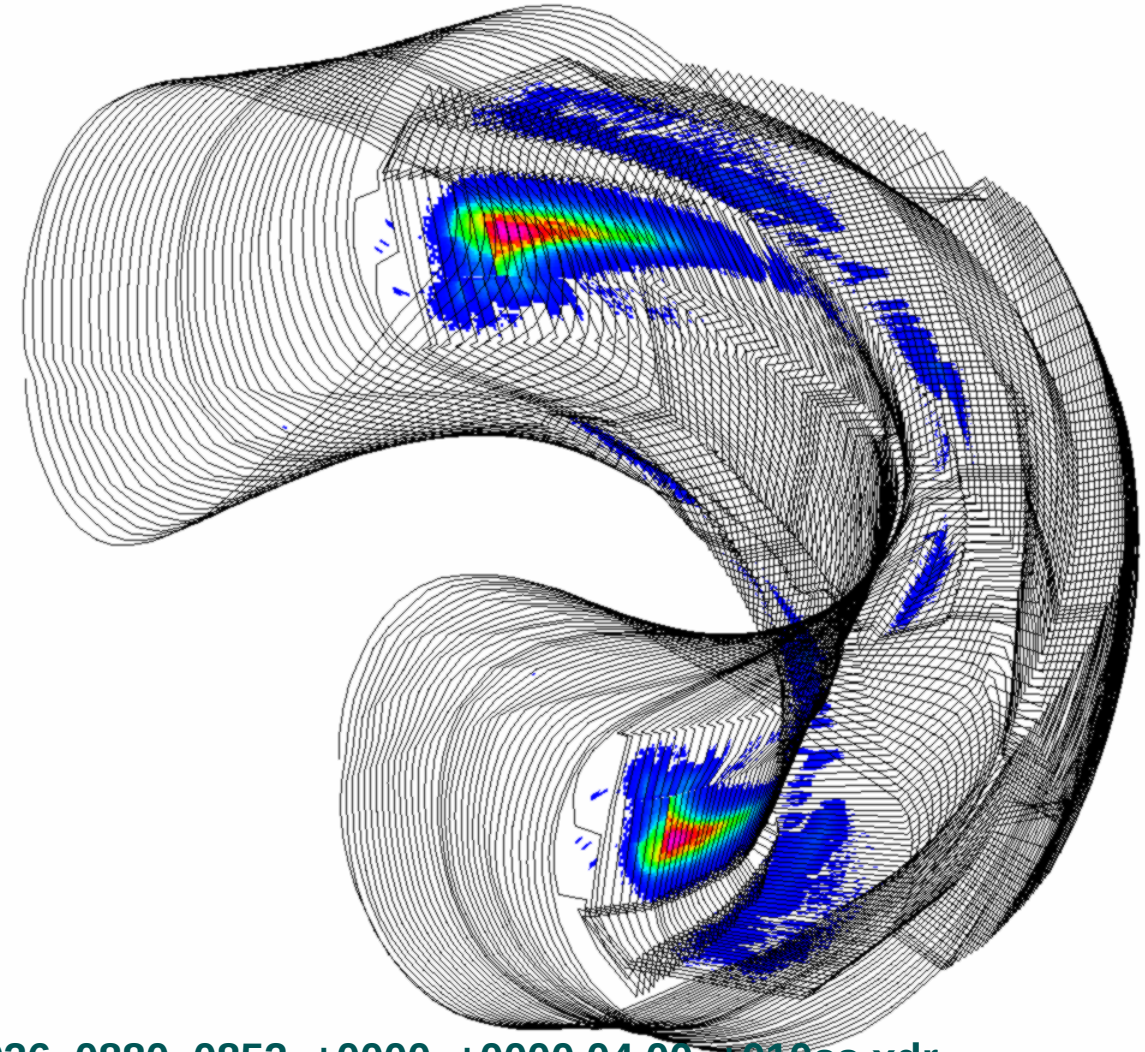
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_-02000.xdr

Originalgeometrie, High Iota, Beta = 0,0 %, Itor = -20 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.00_-02000.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 10 kA



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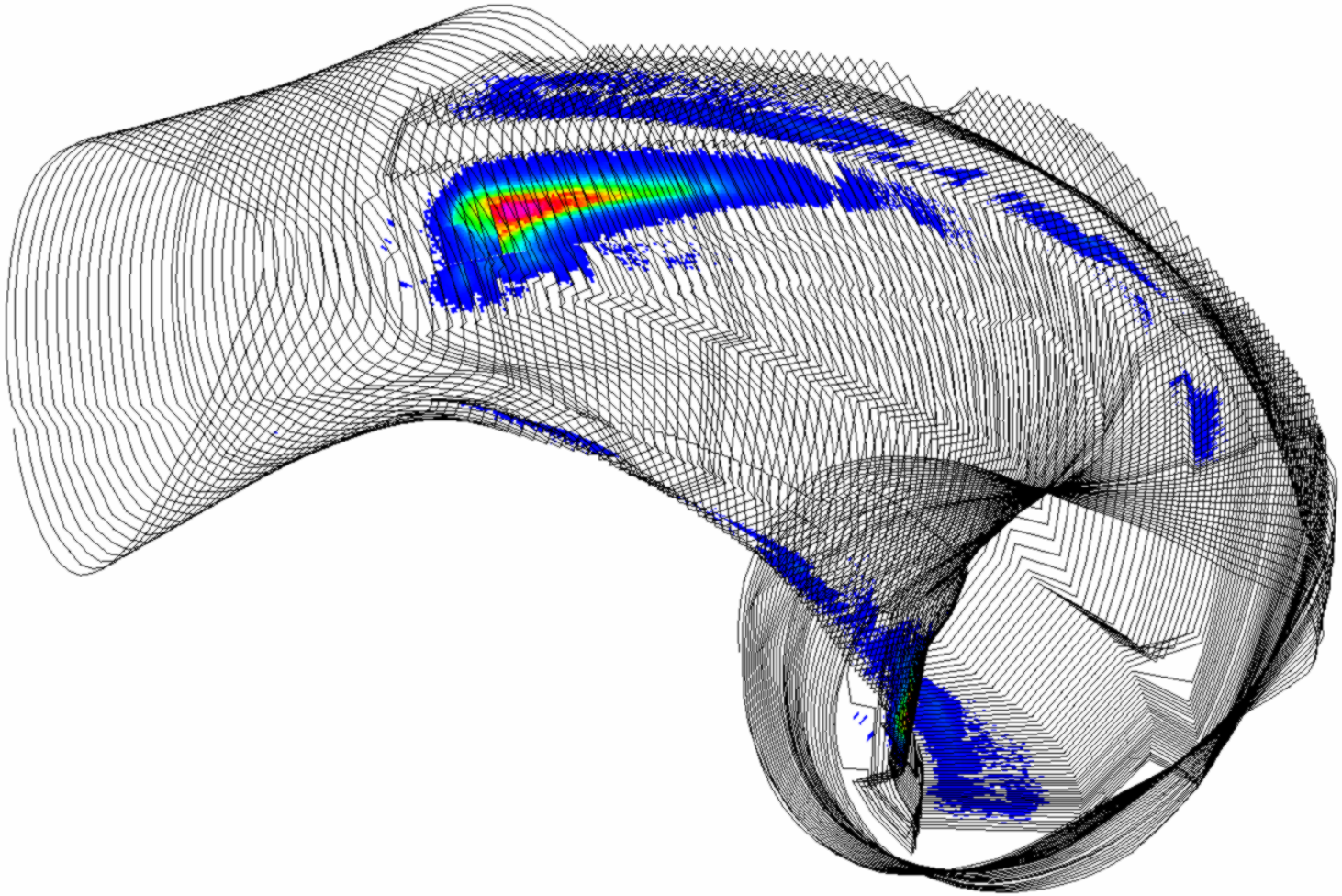
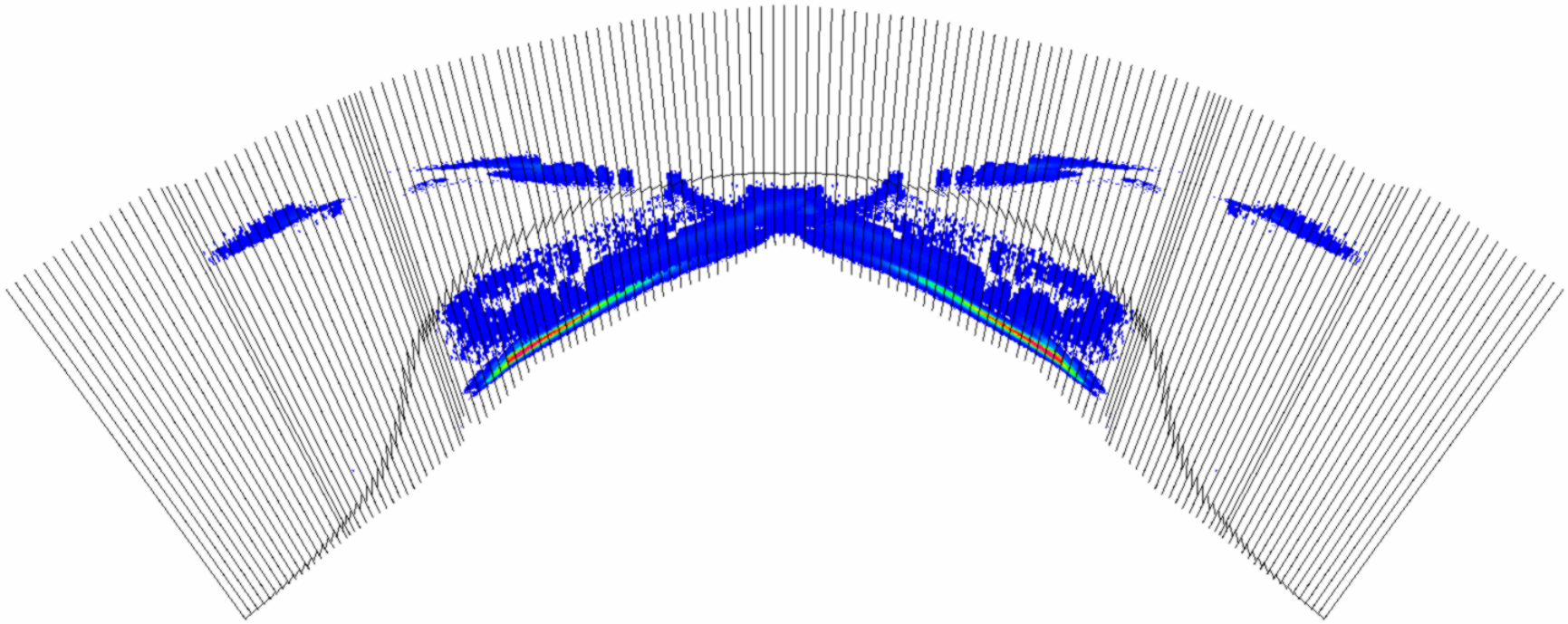
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 10 kA



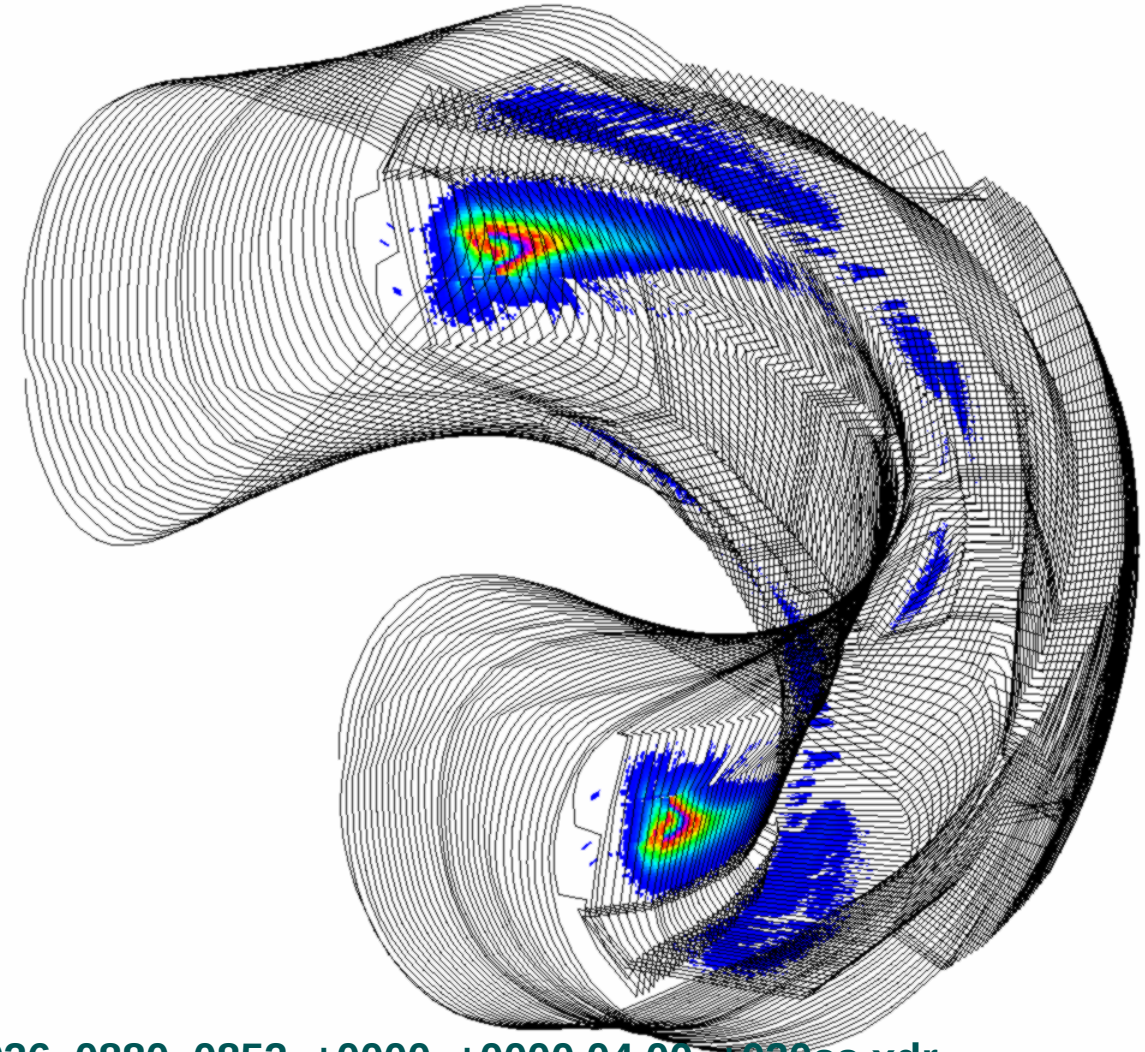
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 10 kA



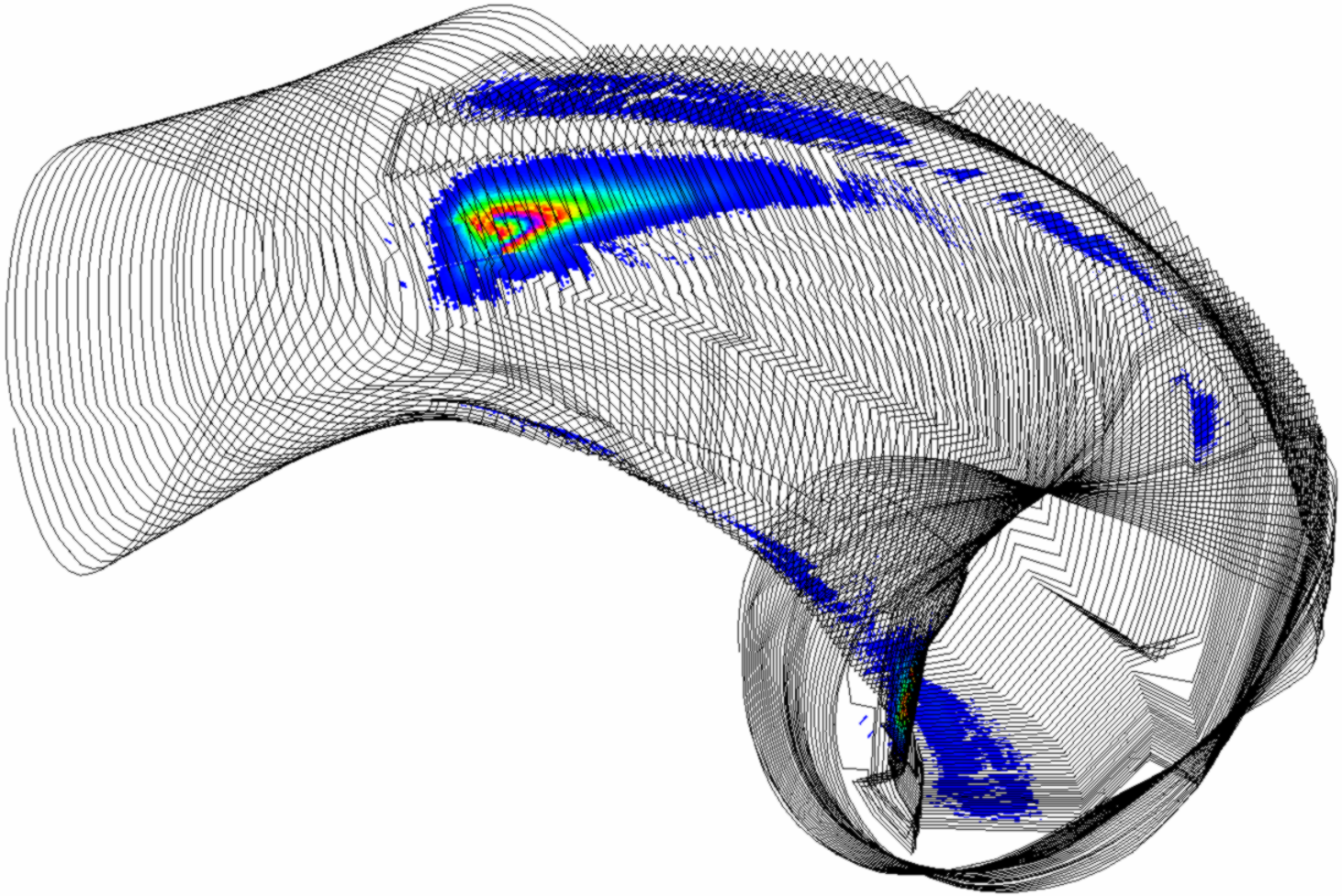
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 20 kA



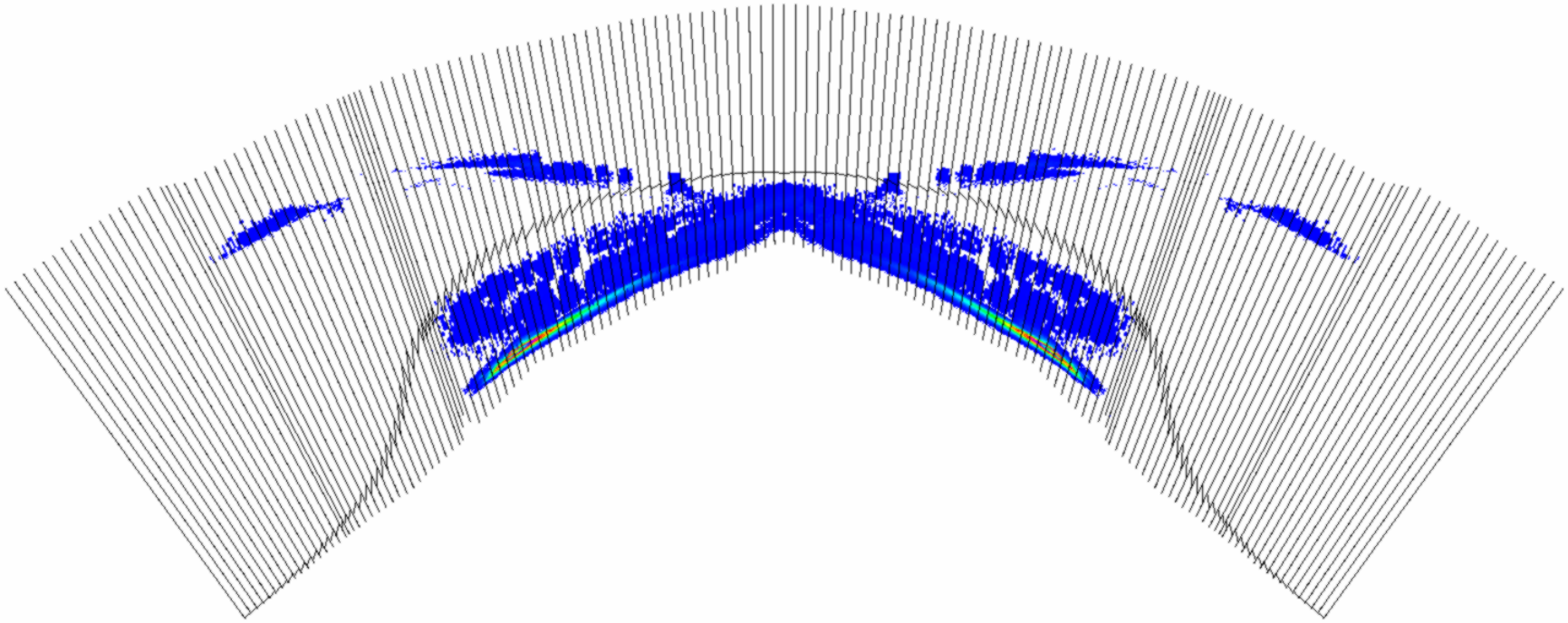
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_+020ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 20 kA



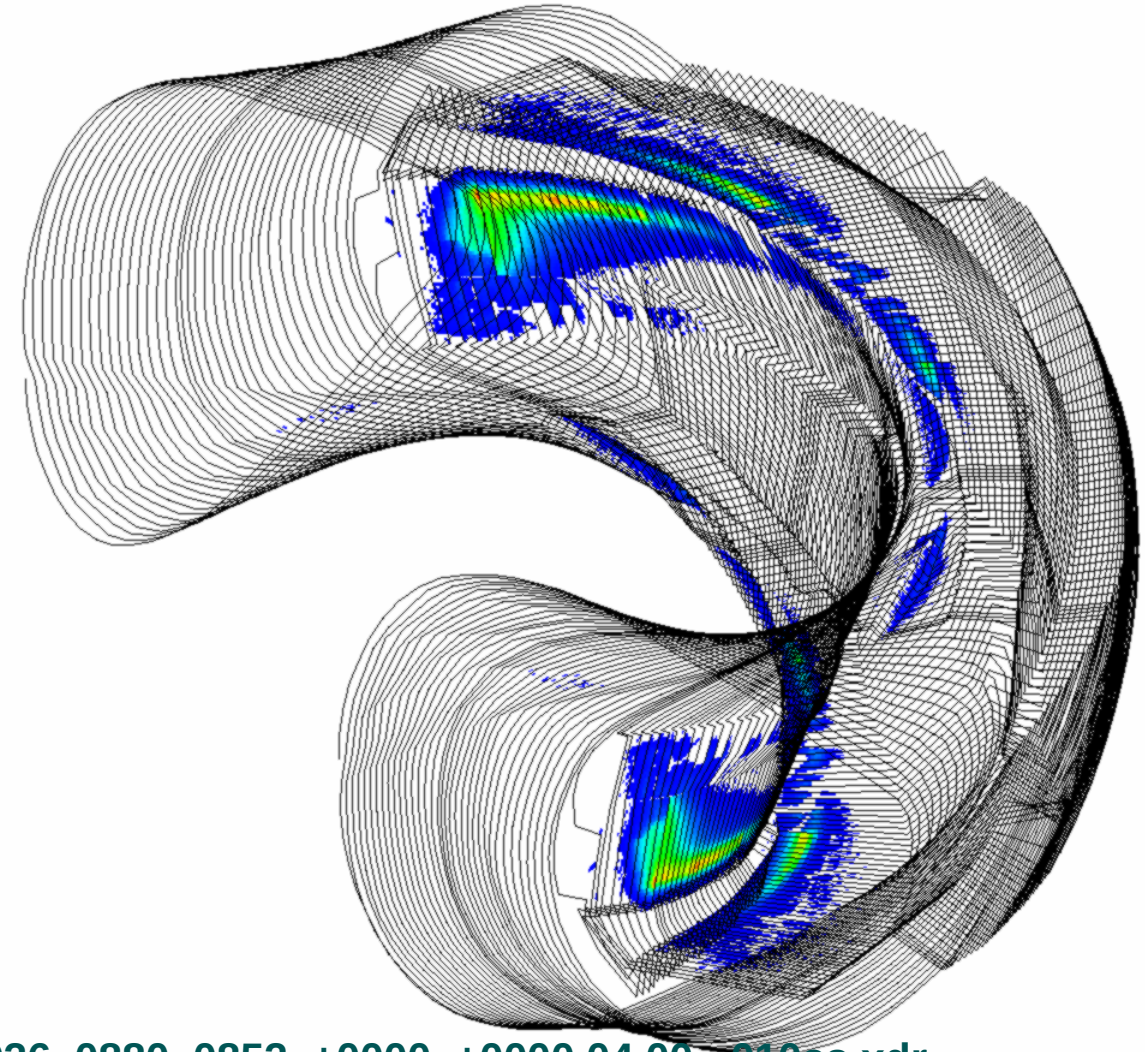
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_+020ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 20 kA



fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_+020ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -10 kA



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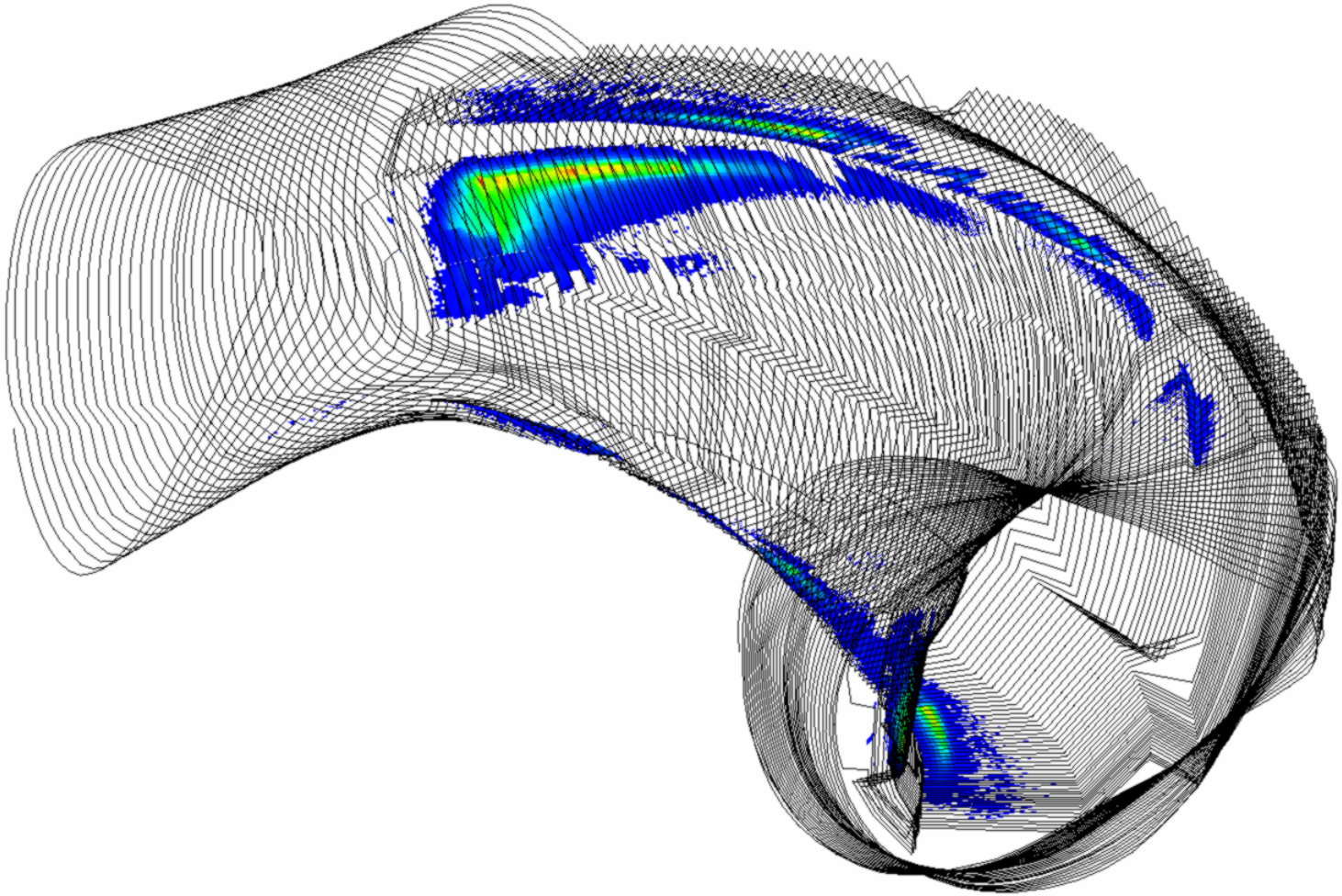
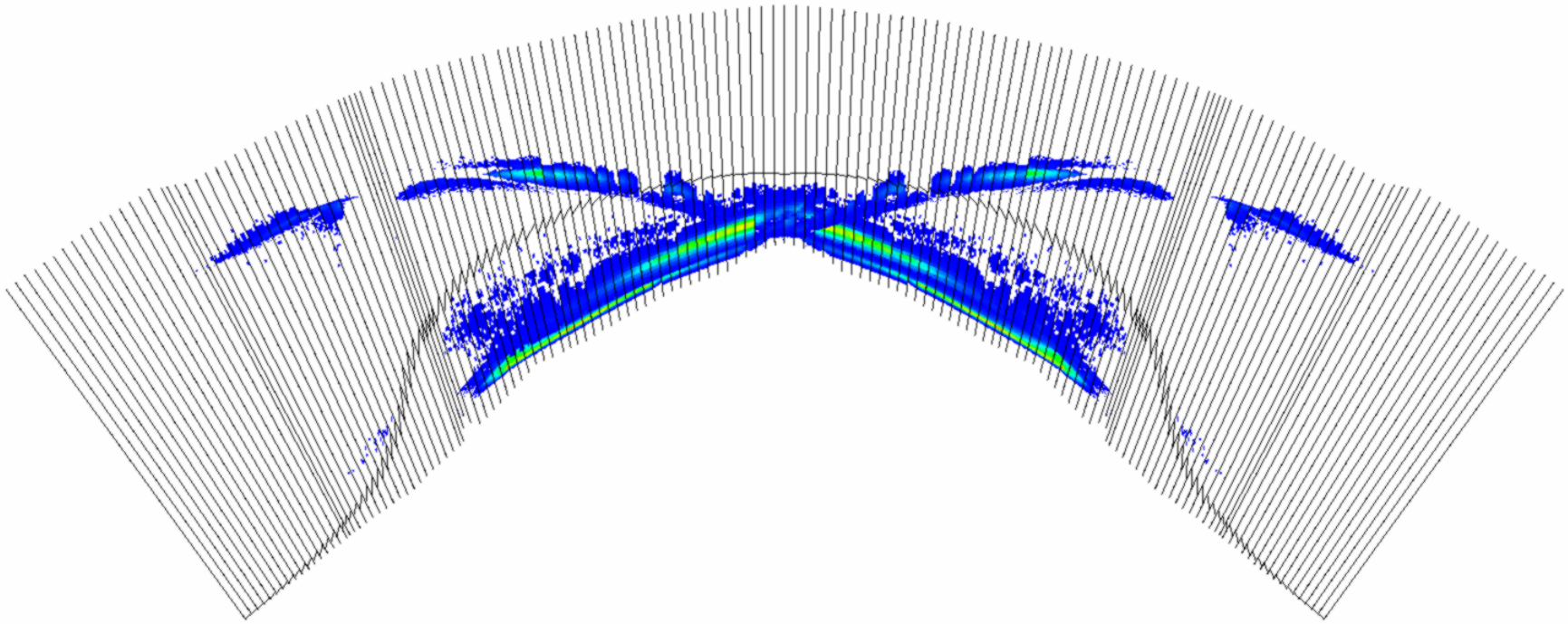
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -10 kA



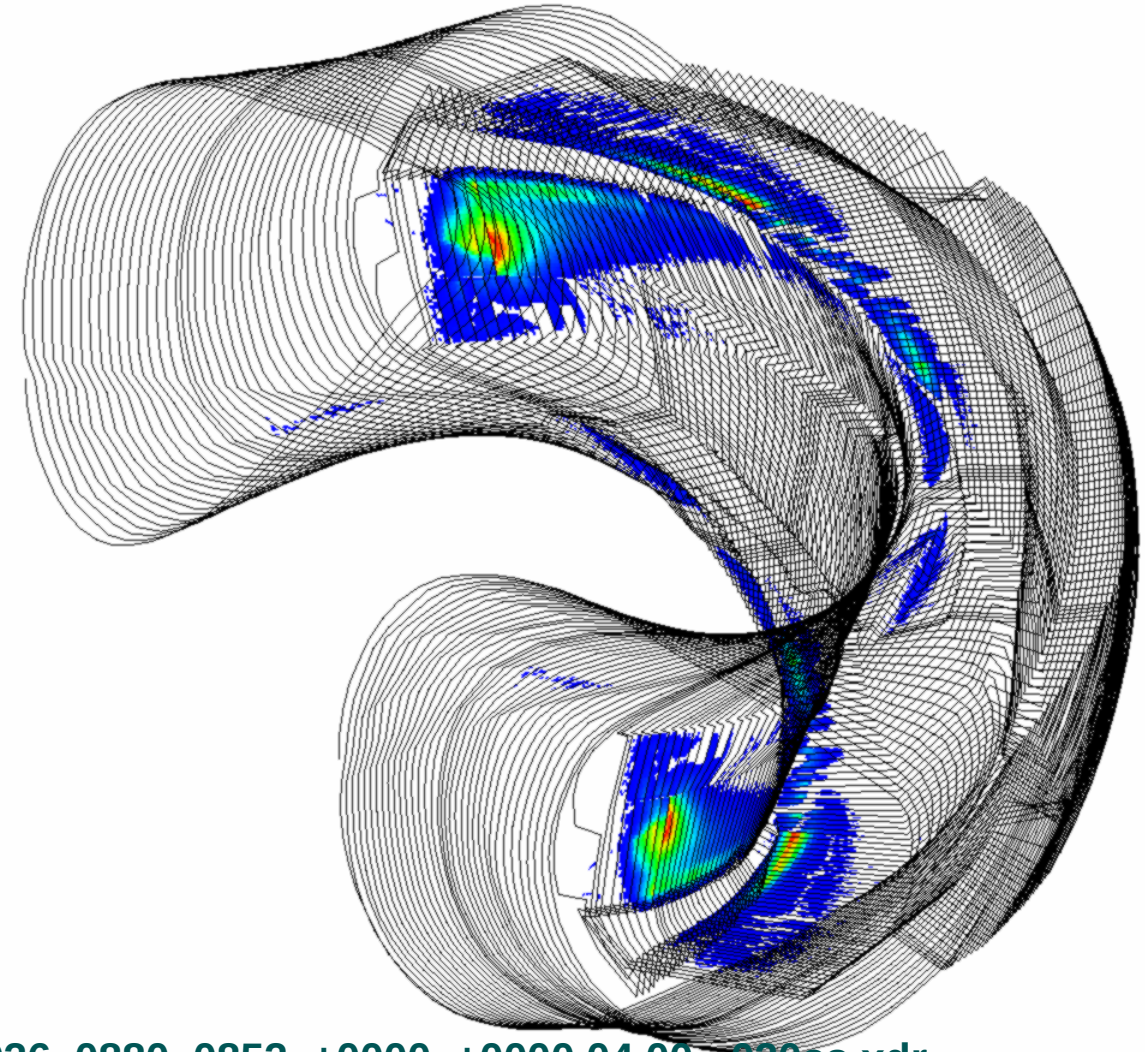
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -10 kA



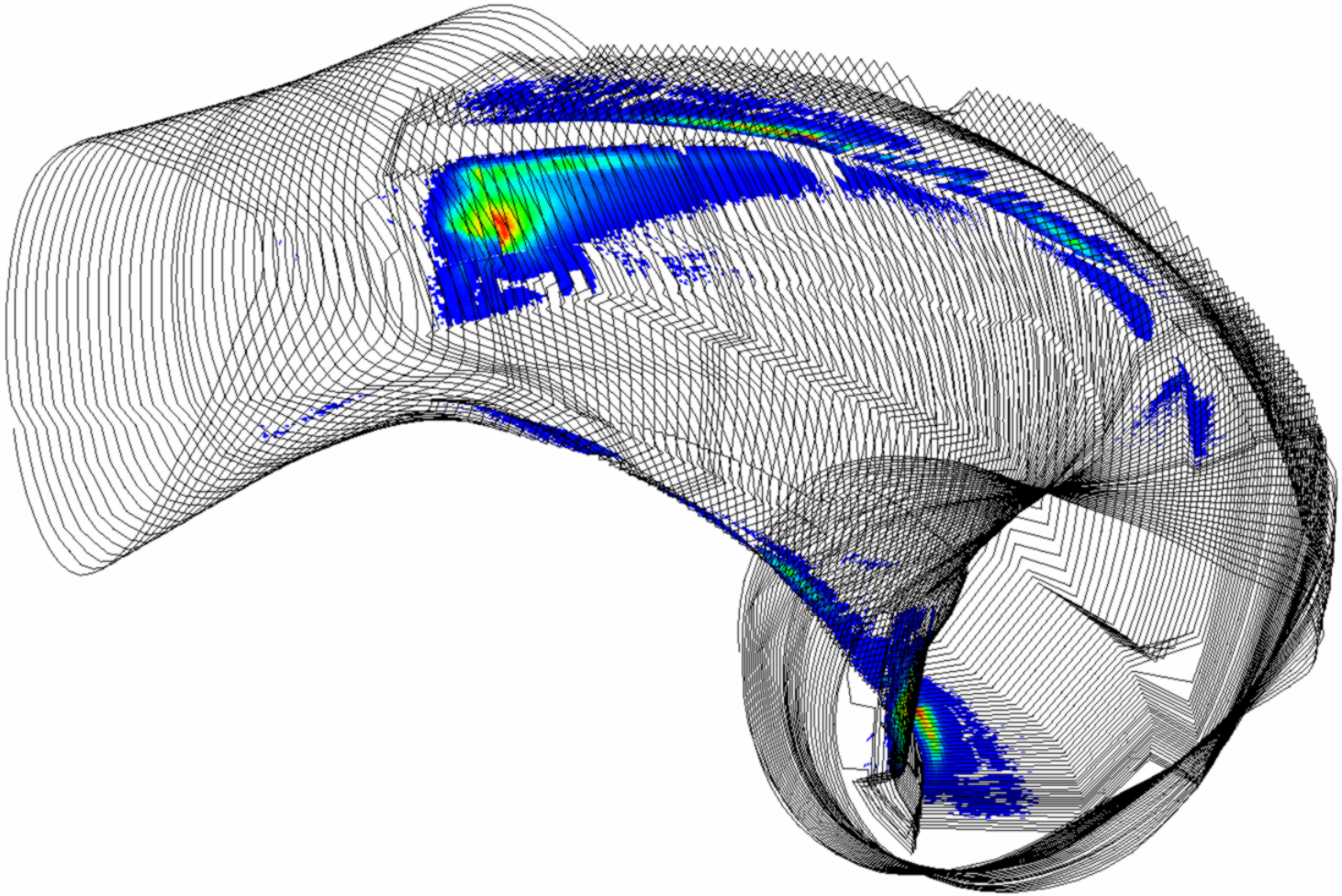
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -20 kA (gegen den Trend)



fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.00_-020ss.xdr

Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -20 kA



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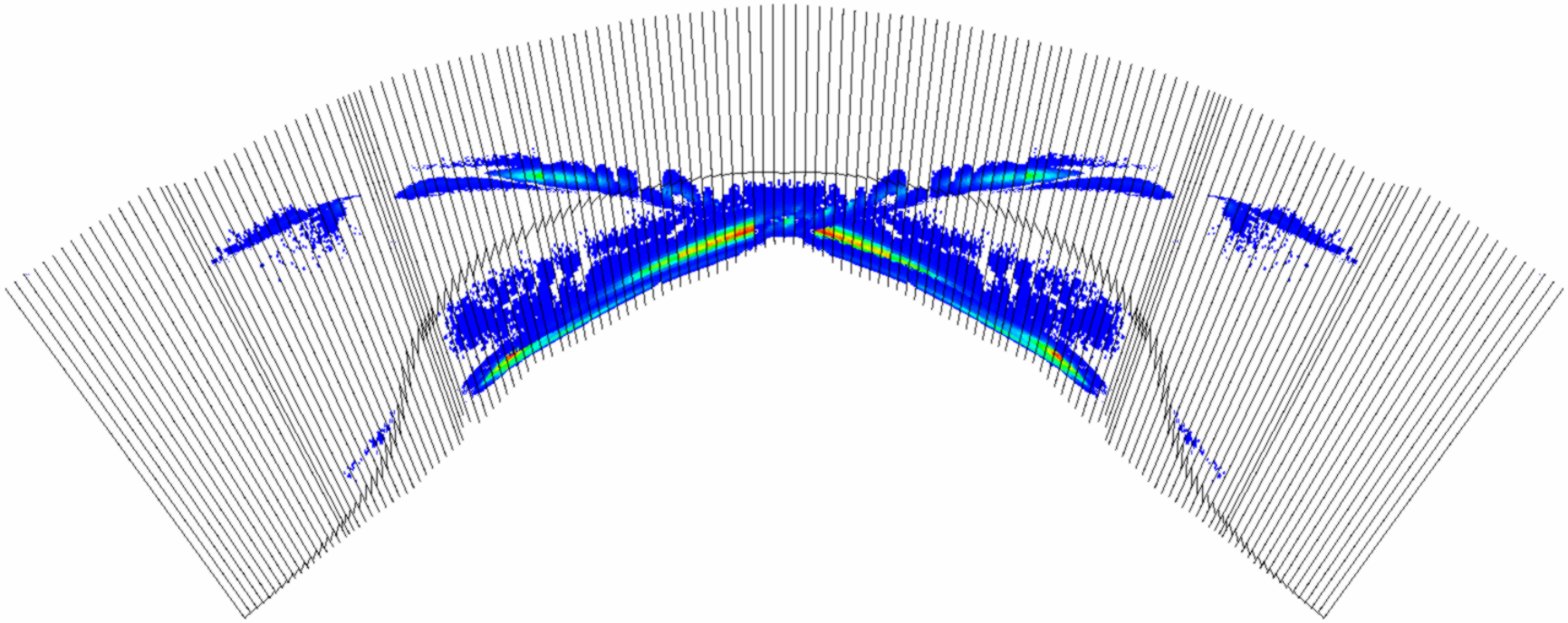
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -20 kA



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Changes in heat load pattern with Itor ≈ ±10 kA and varied beta

Standard, Itor = 12 kA: with increasing beta, the heat load on TMv decreases and the load on TMh increases. For beta > 2% a second strike line on the outside of TMh appears.

Standard, Itor = -12 kA: with increasing beta, the heat load on TMv increases slightly, otherwise almost no changes

High Iota, Itor = 10 kA: almost no change.

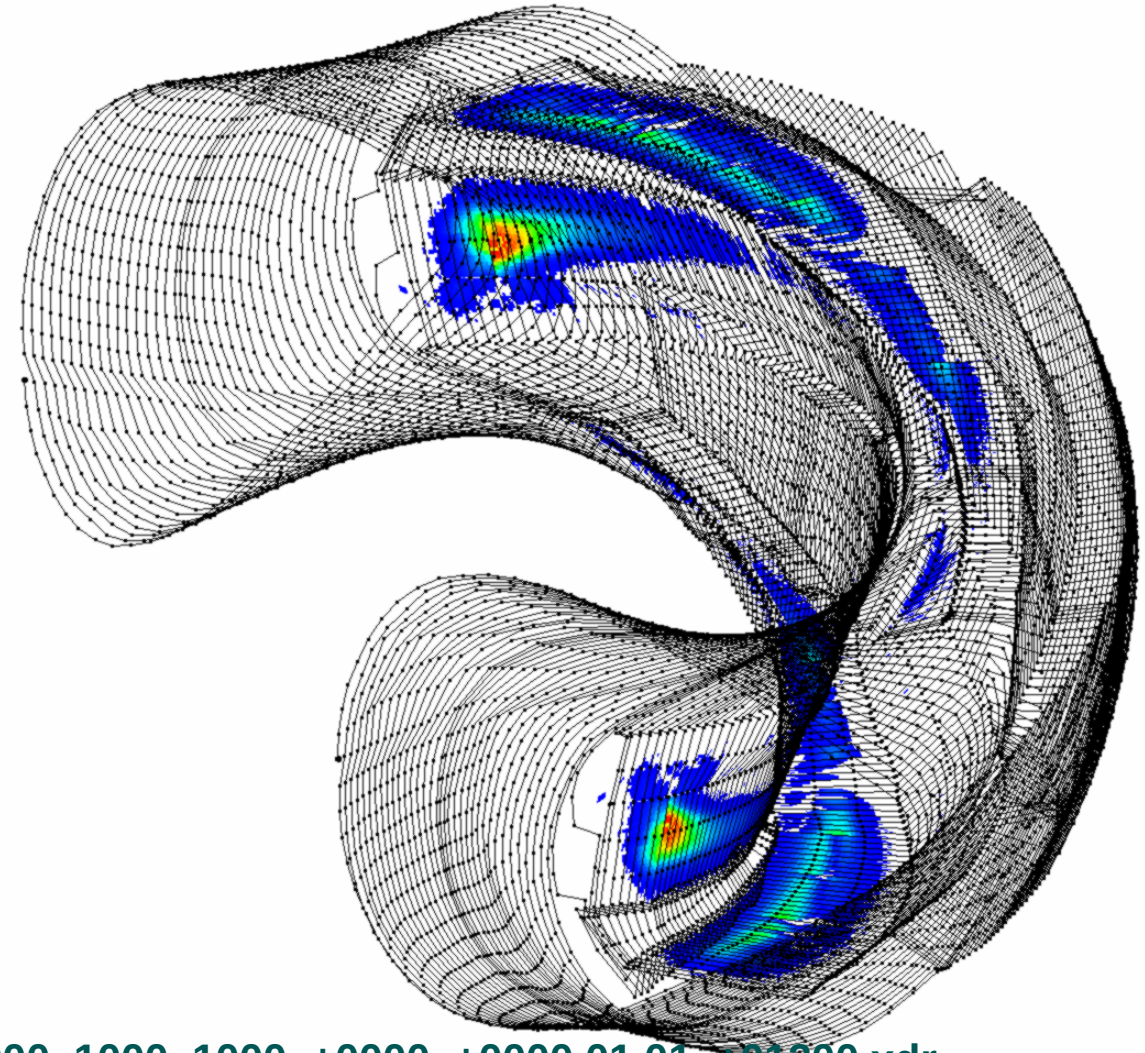
High Iota, Itor = -10 kA: two out of four simulations failed.

High Mirror: Very similar to Standard

High Mirror, Itor = 10 kA: with increasing beta, the heat load on TMv decreases and the load on TMh increases. On TMh, two strikelines develop. (Similar Standard)

High Mirror, Itor = -10 kA: with increasing beta, the heat load on TMv decreases slightly and the loaded area on TMh increases. Two strikelines become visible on TMh.

Originalgeometrie, Standard, Beta = 0,16 %, Itor = 12 kA



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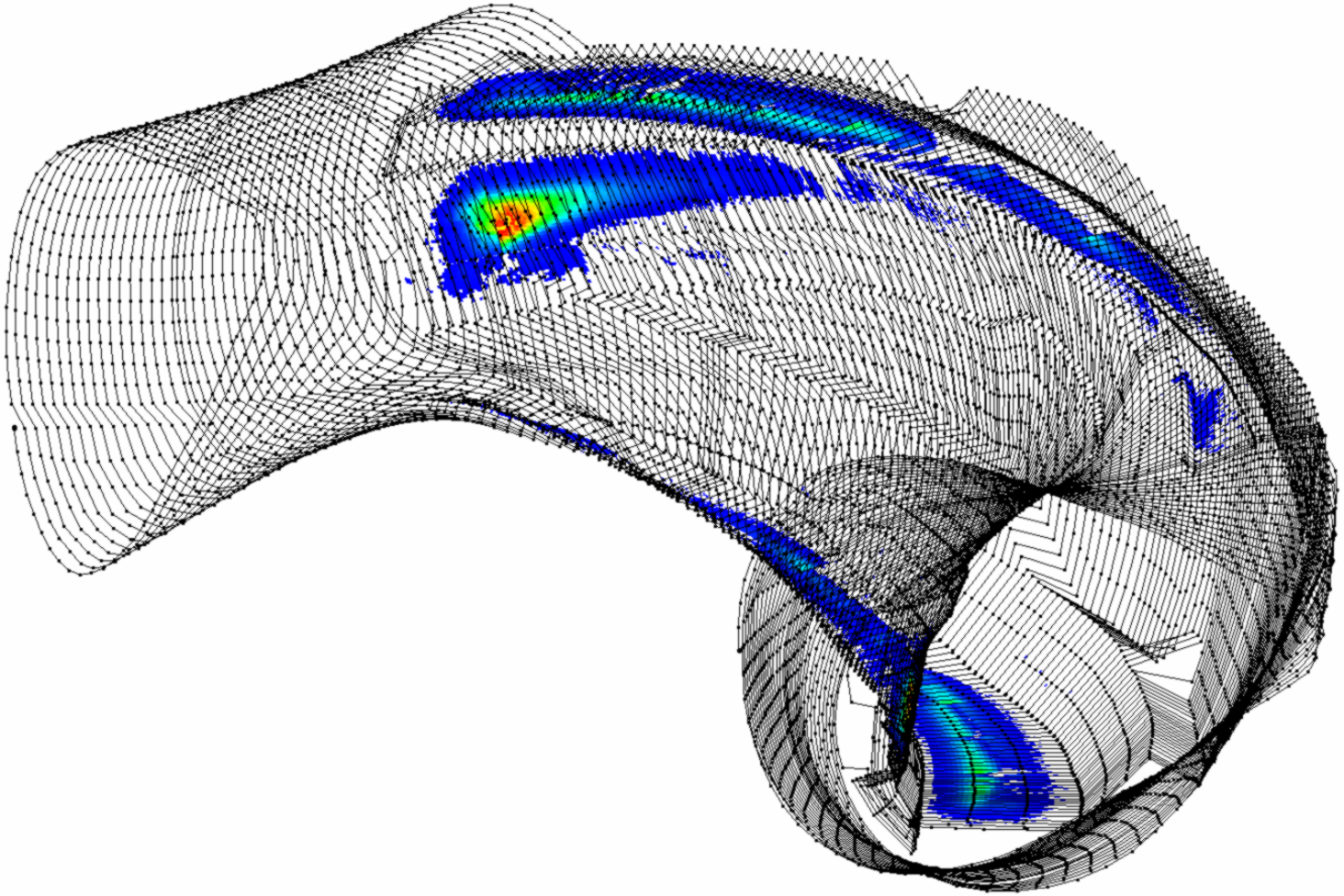
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 12 kA



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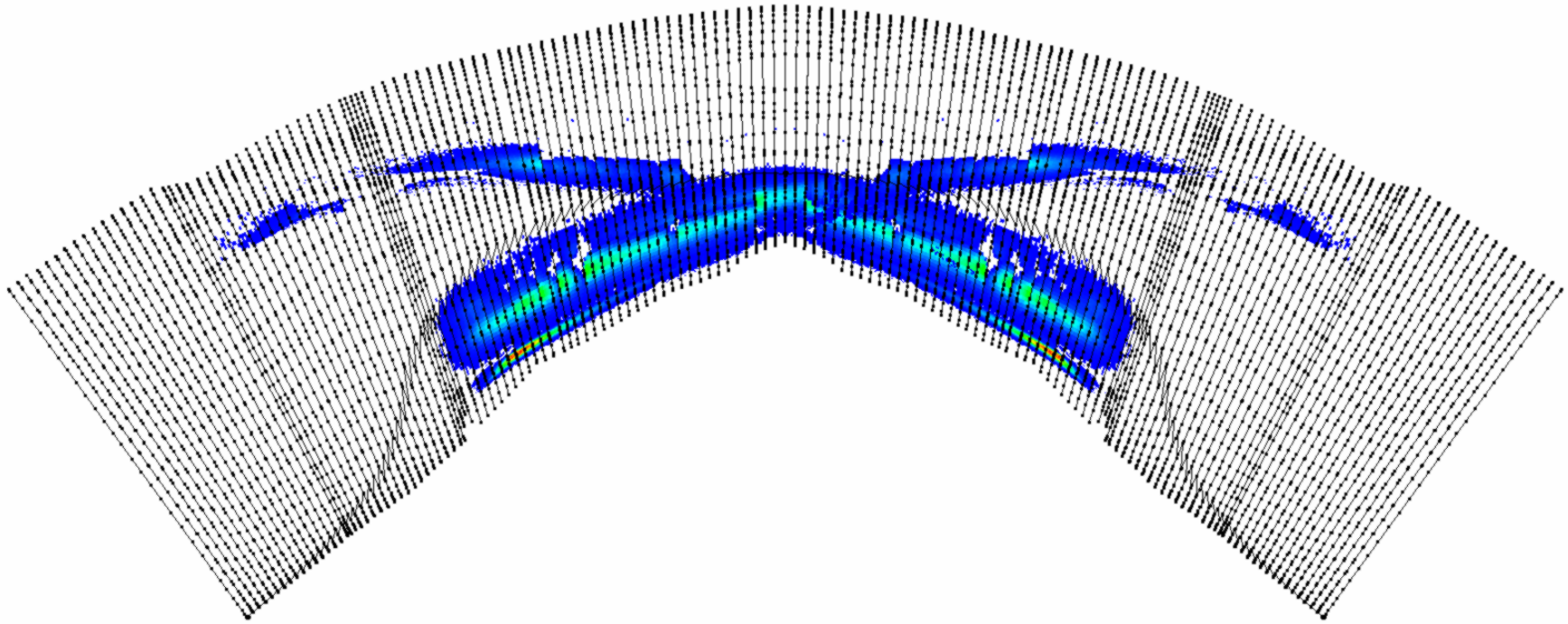
Originalgeometrie, Standard, Beta = 0,16 %, Itor = 12 kA



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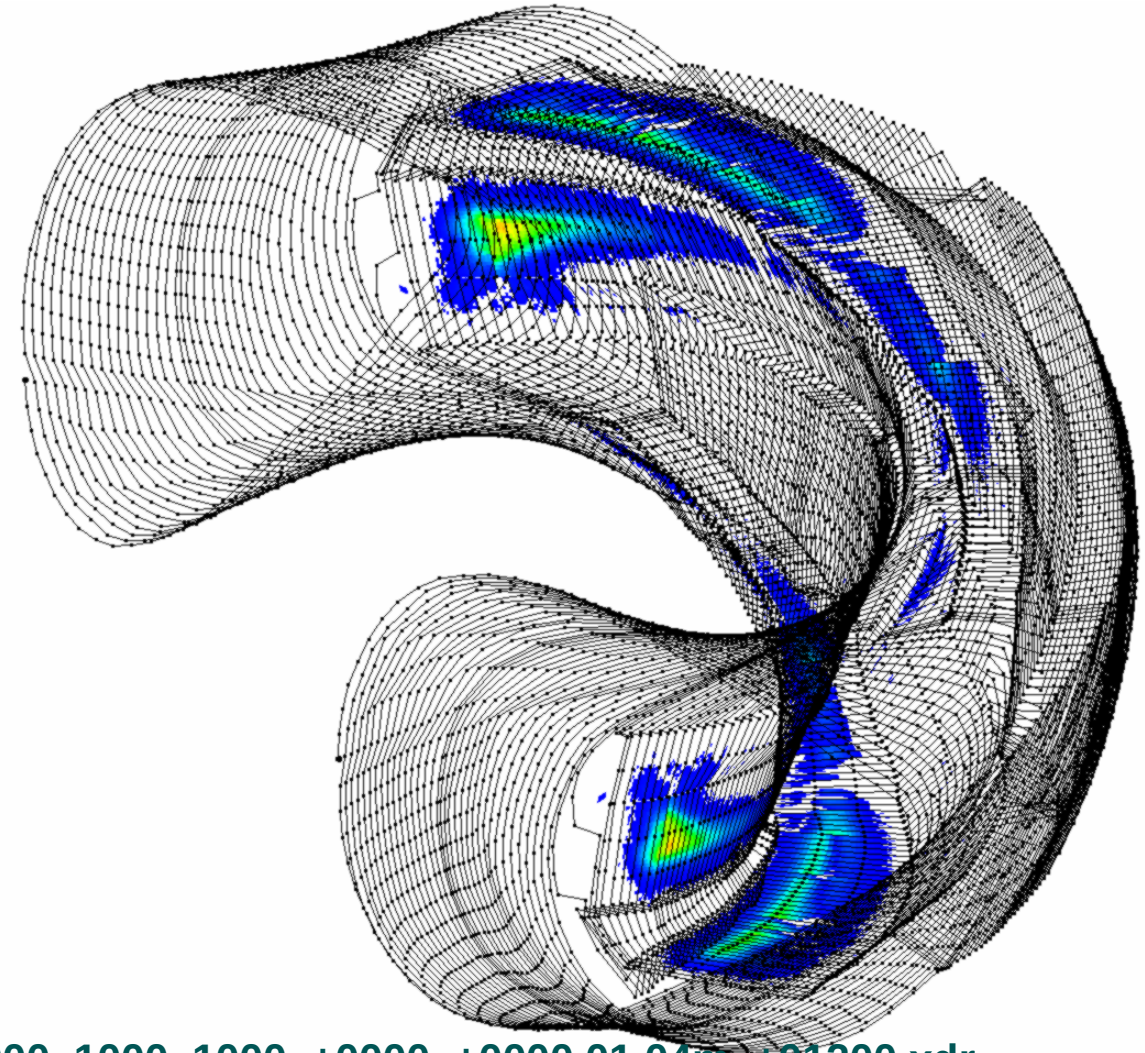
Originalgeometrie, Standard, Beta = 0,65 %, Itor = 12 kA



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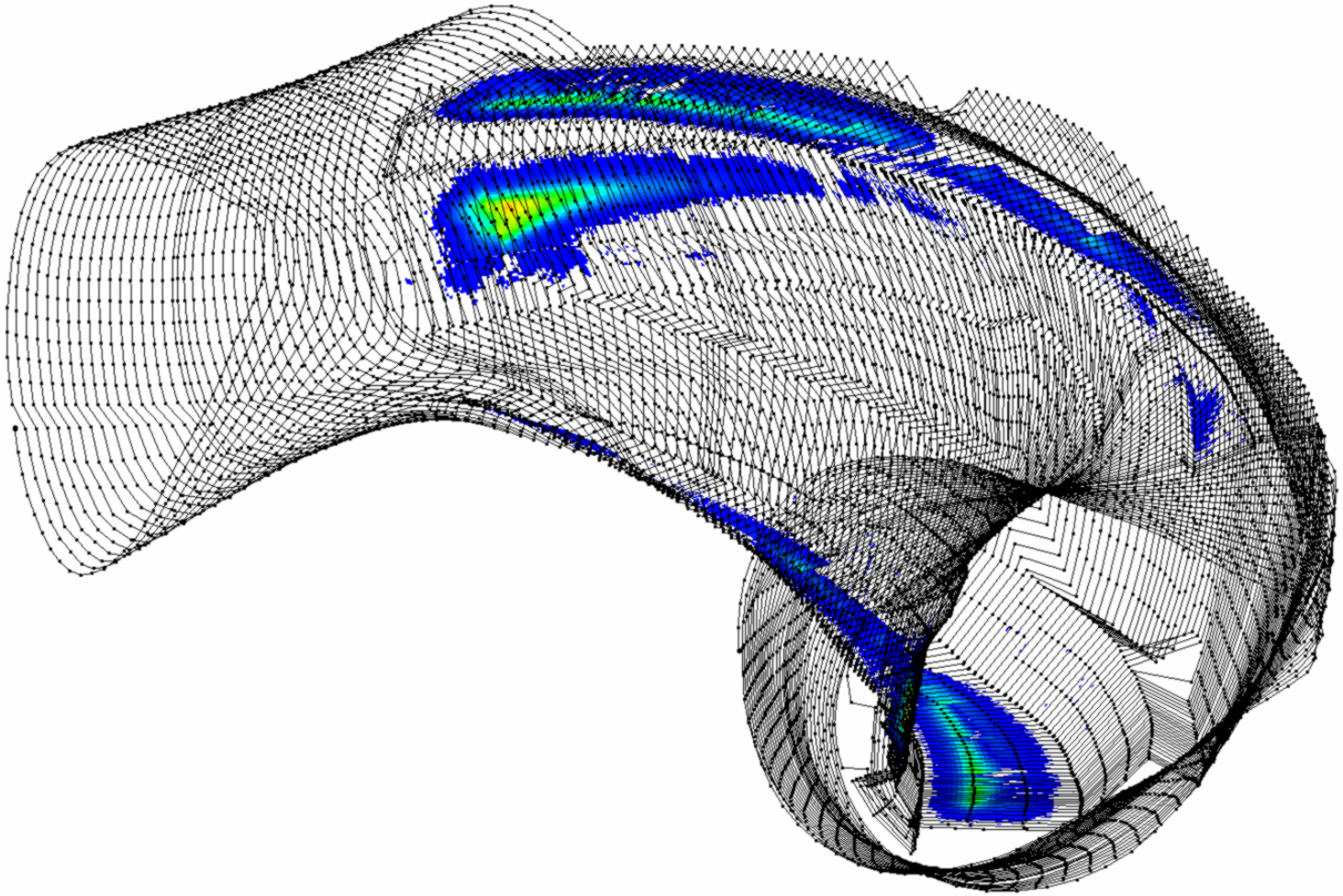
Originalgeometrie, Standard, Beta = 0,65 %, Itor = 12 kA



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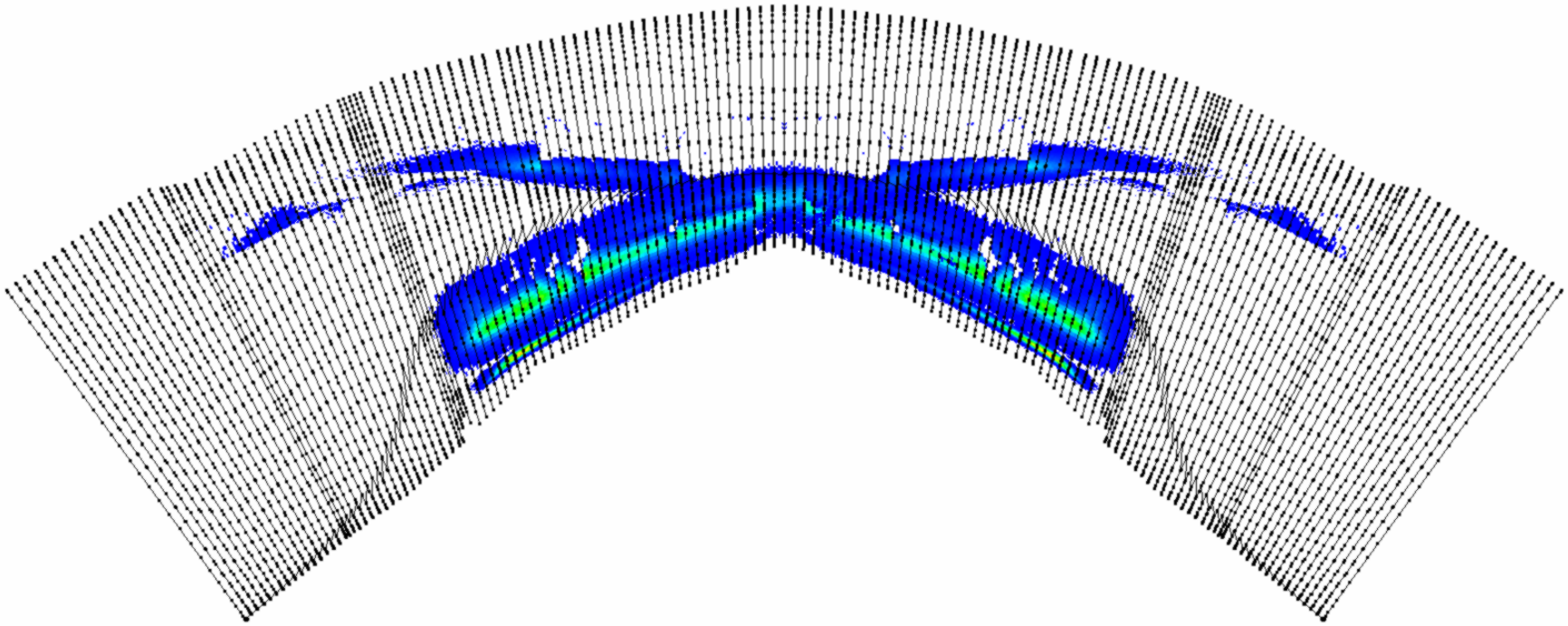
Originalgeometrie, Standard, Beta = 0,65 %, Itor = 12 kA



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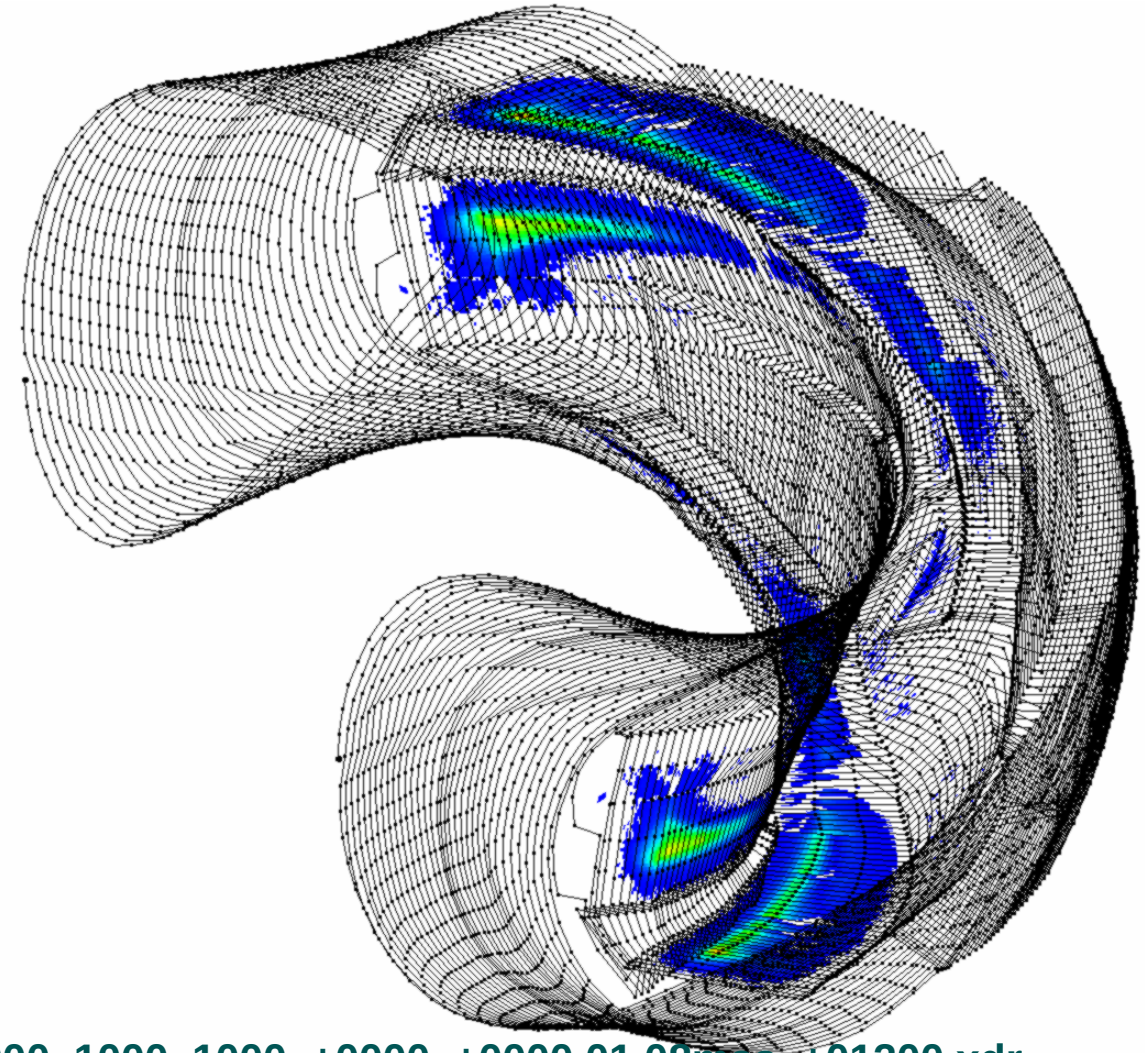
Originalgeometrie, Standard, Beta = 1,32 %, Itor = 12 kA



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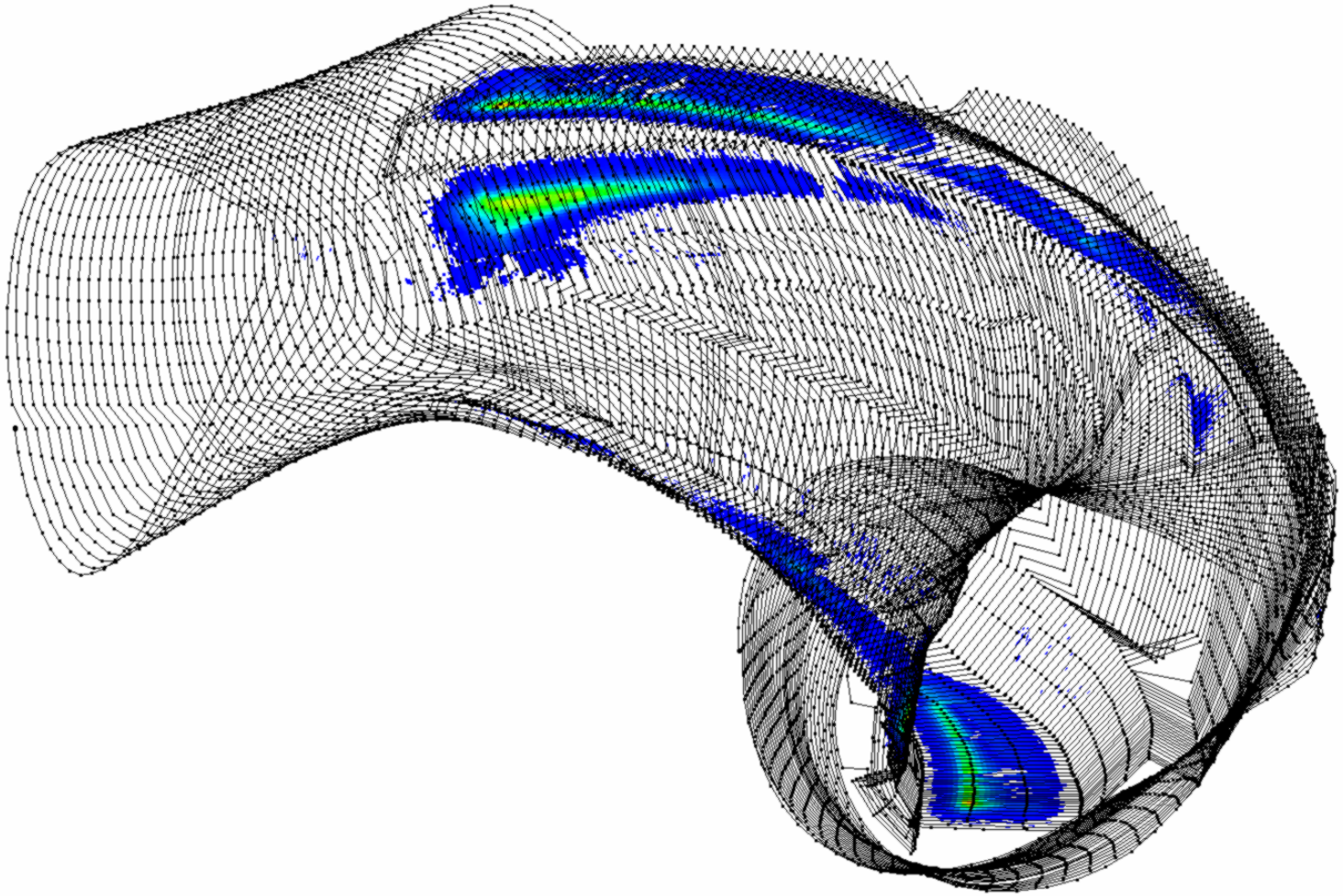
Originalgeometrie, Standard, Beta = 1,32 %, Itor = 12 kA



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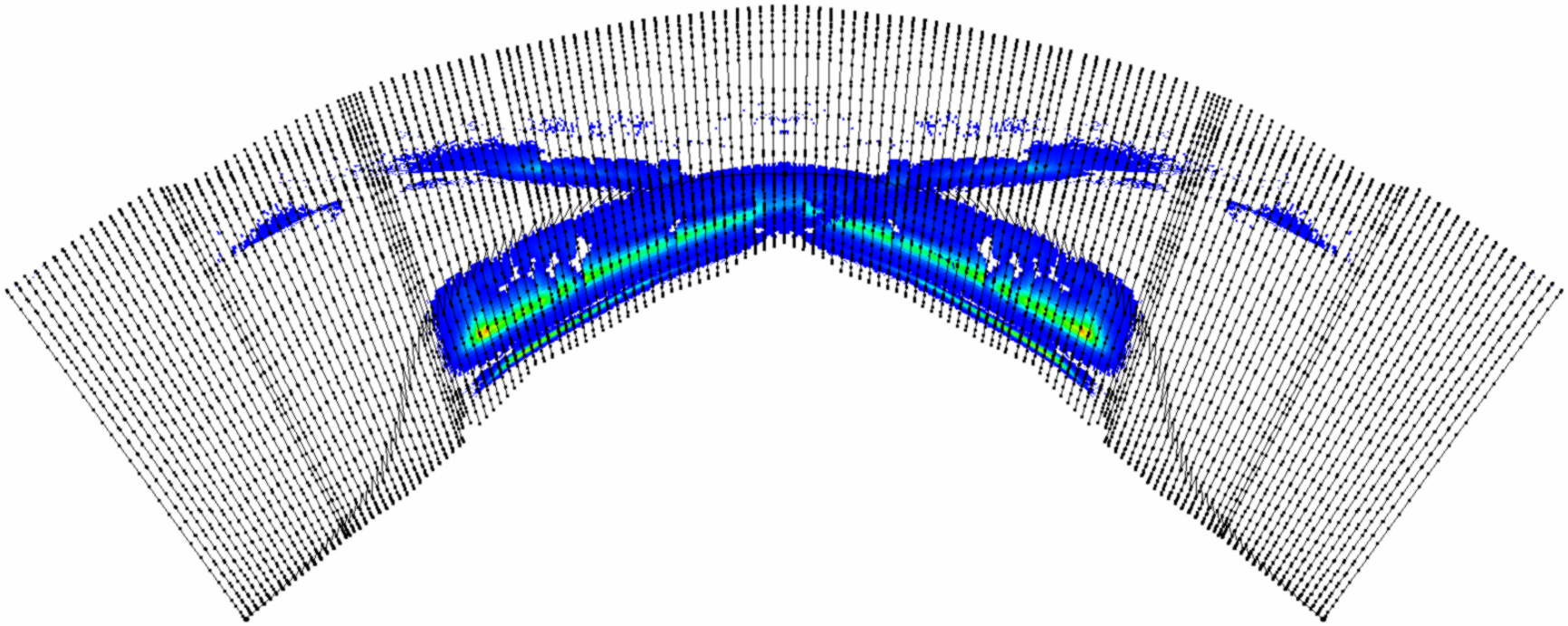
Originalgeometrie, Standard, Beta = 1,32 %, Itor = 12 kA



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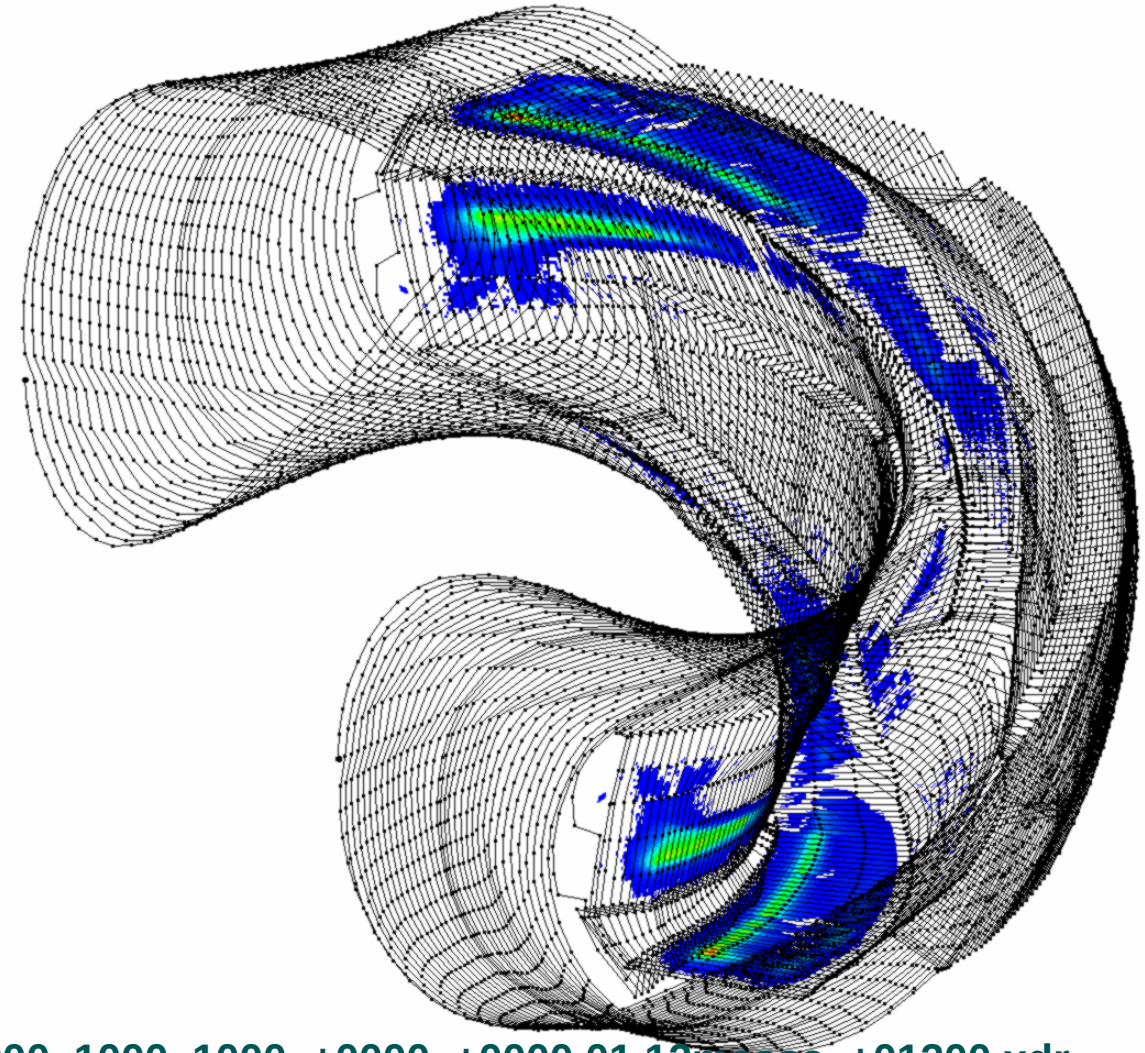
Originalgeometrie, Standard, Beta = 2,0 %, Itor = 12 kA



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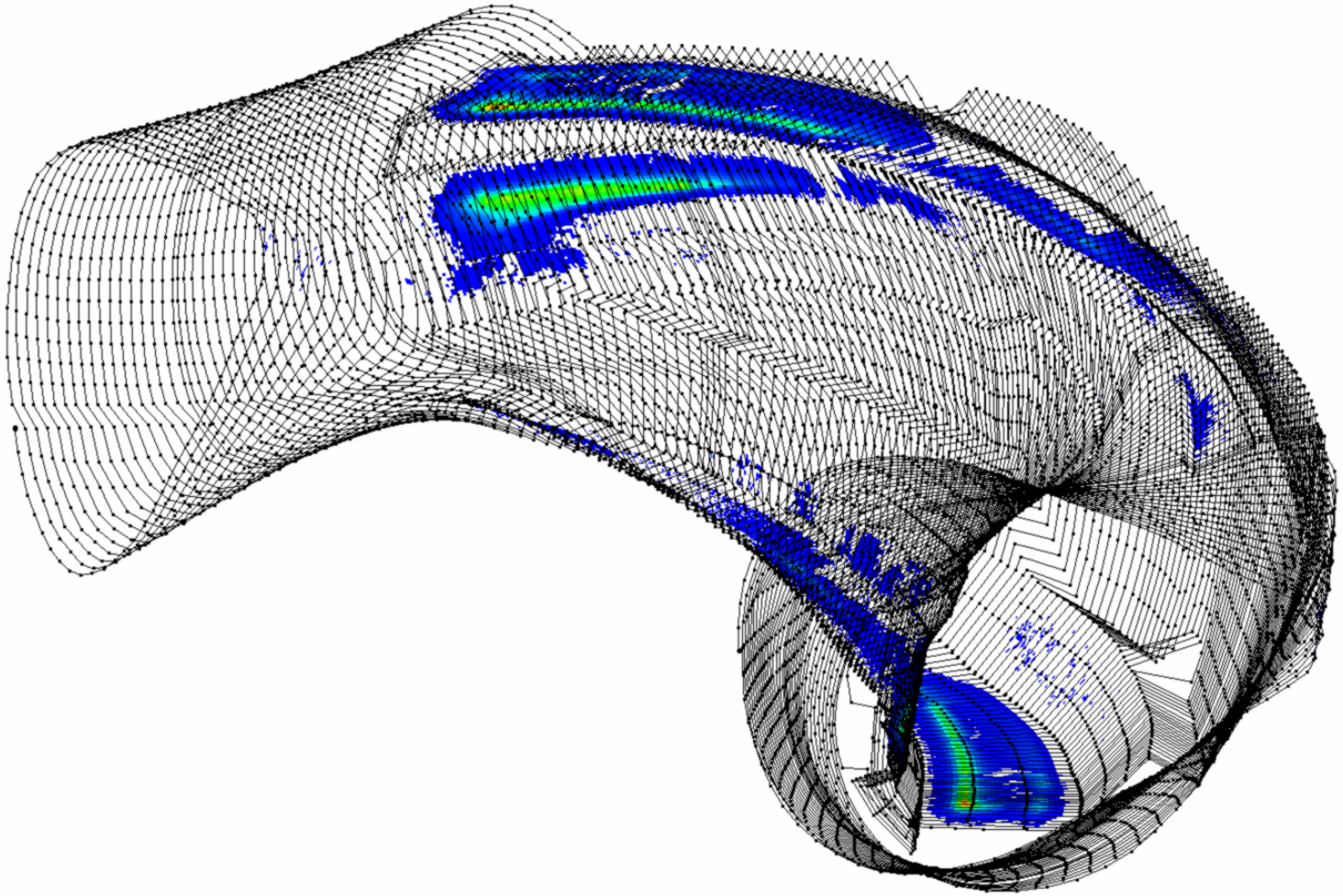
Originalgeometrie, Standard, Beta = 2,0 %, Itor = 12 kA



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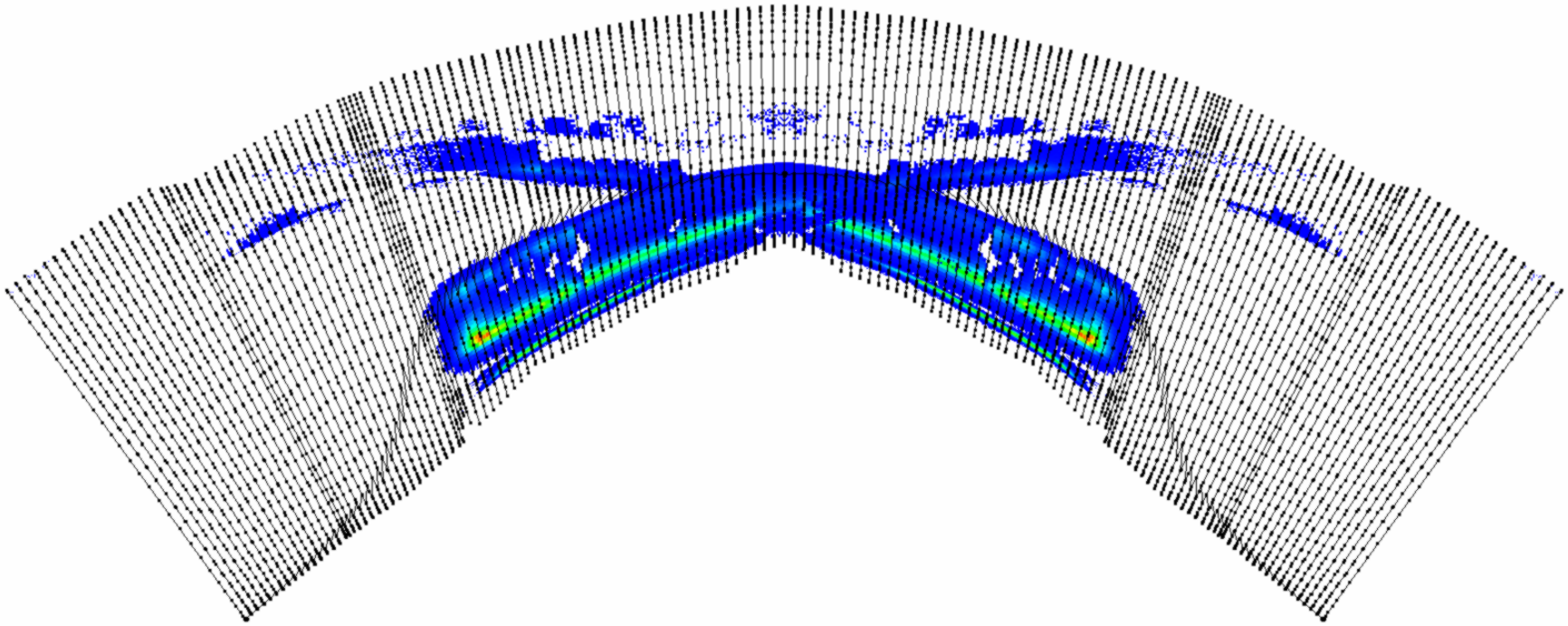
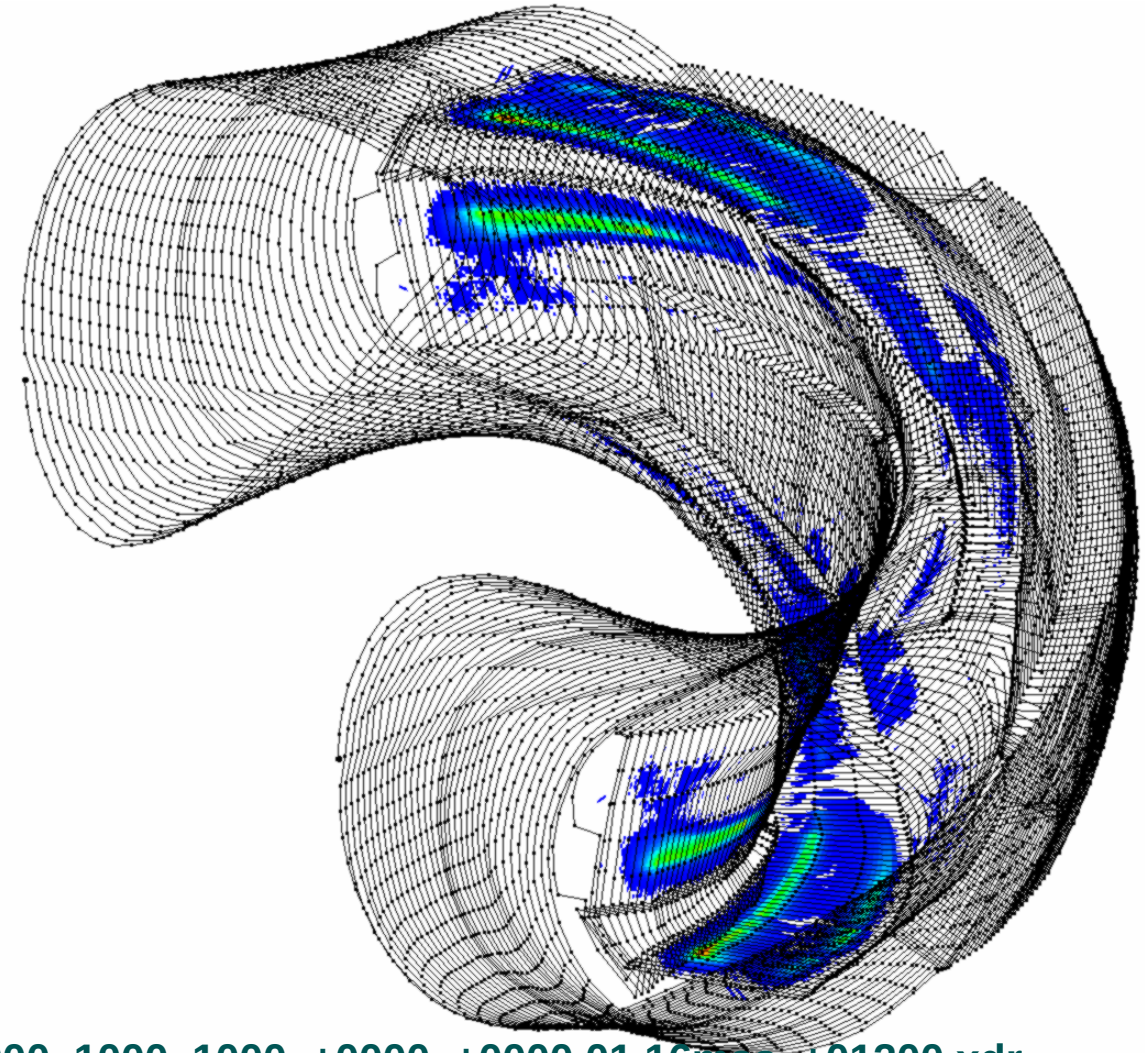
Originalgeometrie, Standard, Beta = 2,0 %, Itor = 12 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.12mssss_+01200.xdr

Originalgeometrie, Standard, Beta = 2,69 %, Itor = 12 kA



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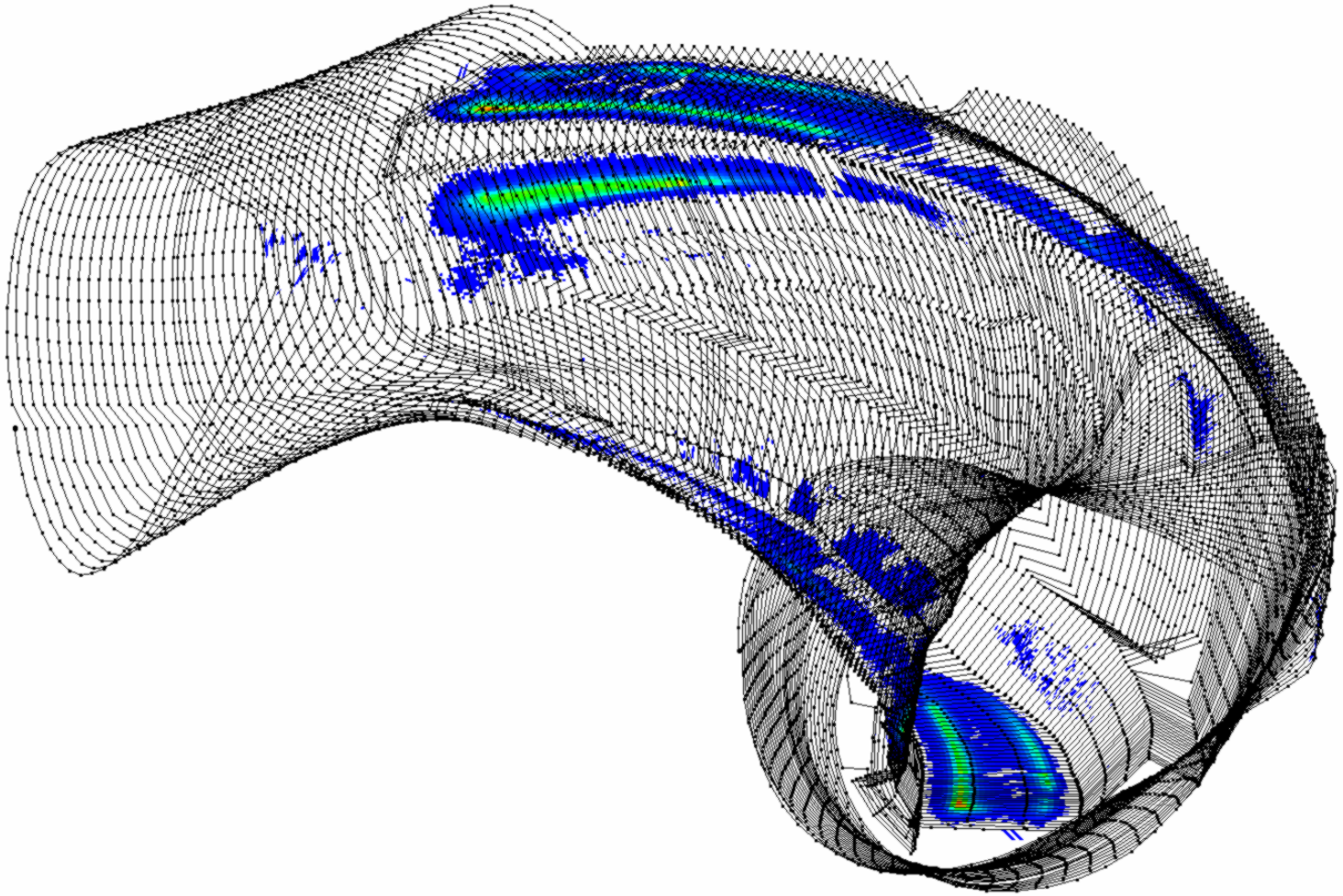
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 12 kA



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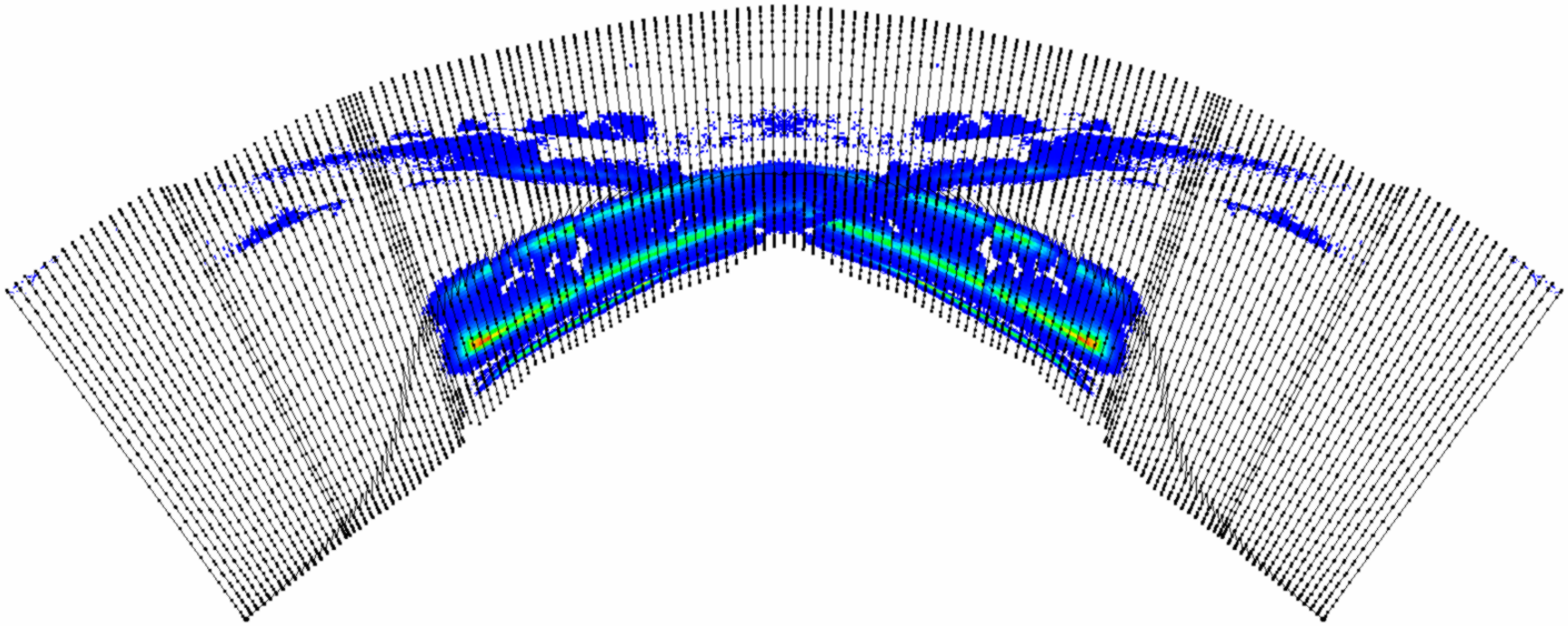
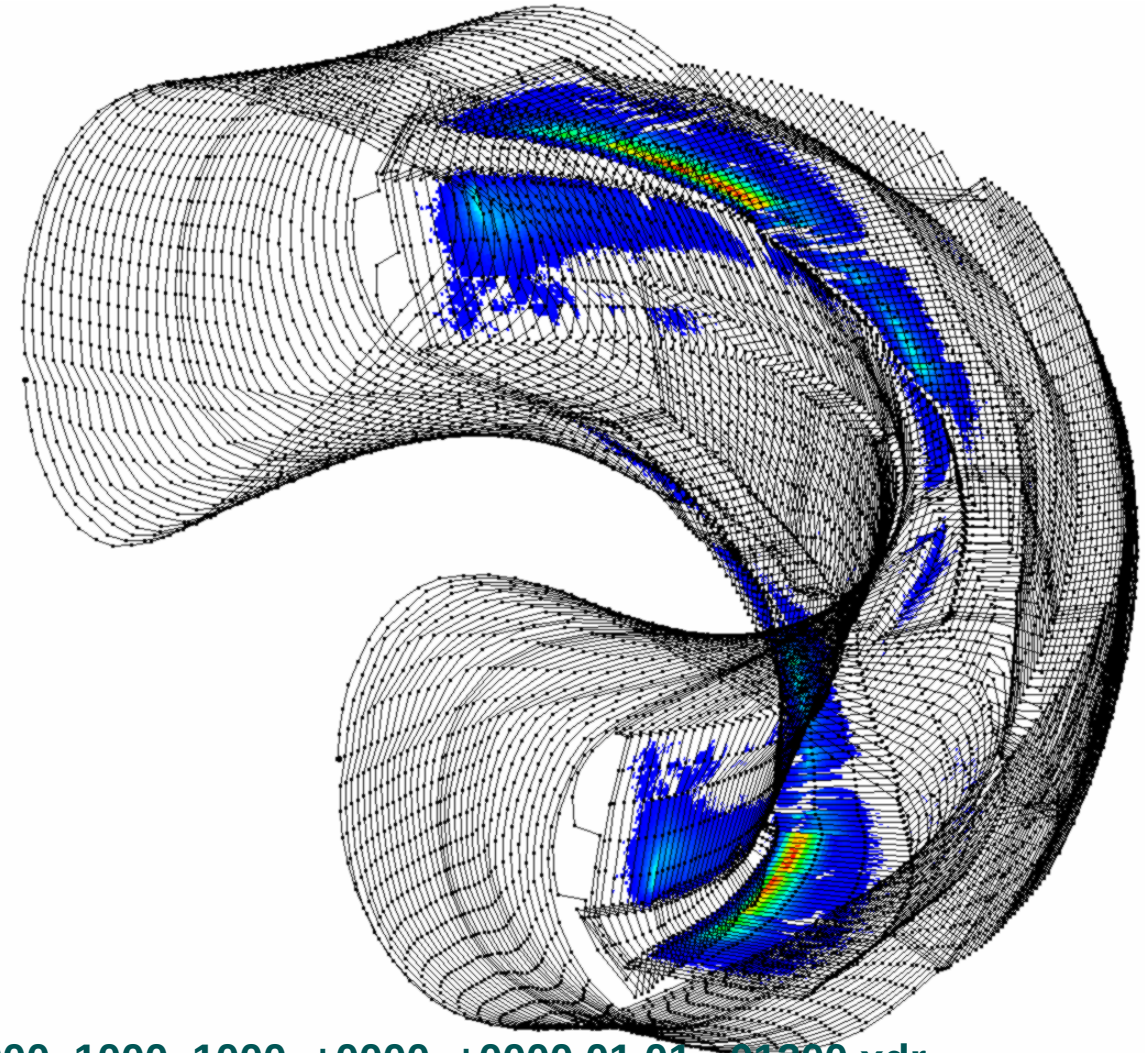
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 12 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.16mss_+01200.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = -12 kA



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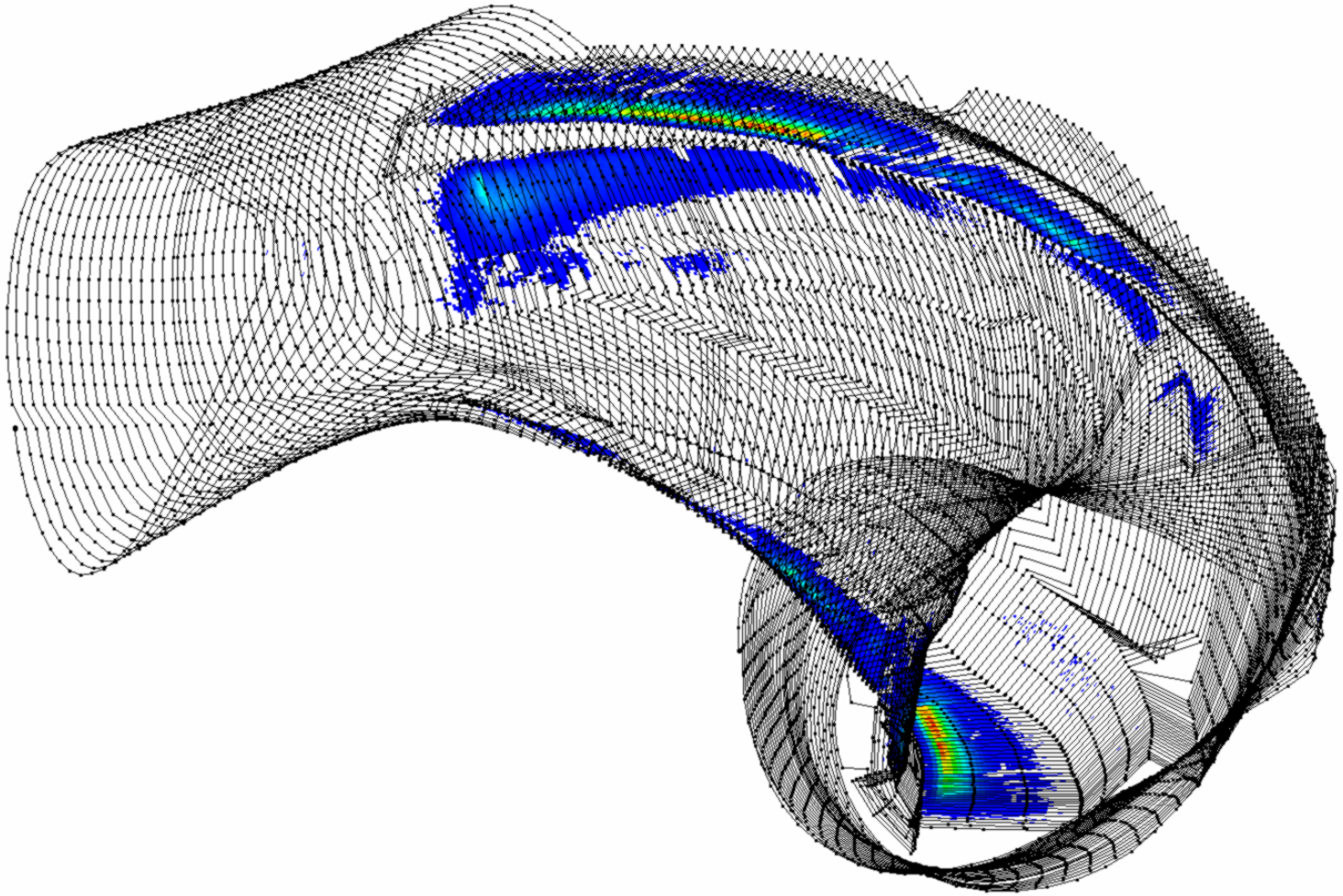
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -12 kA



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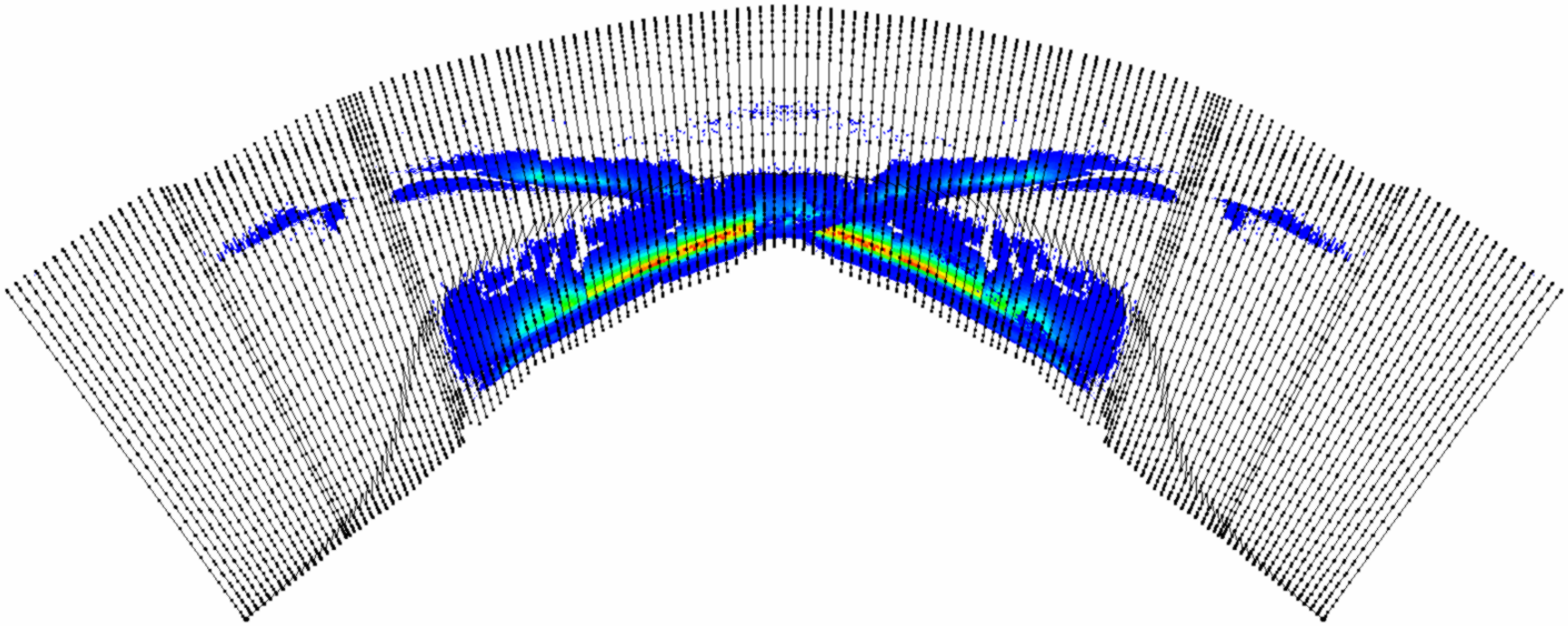
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -12 kA



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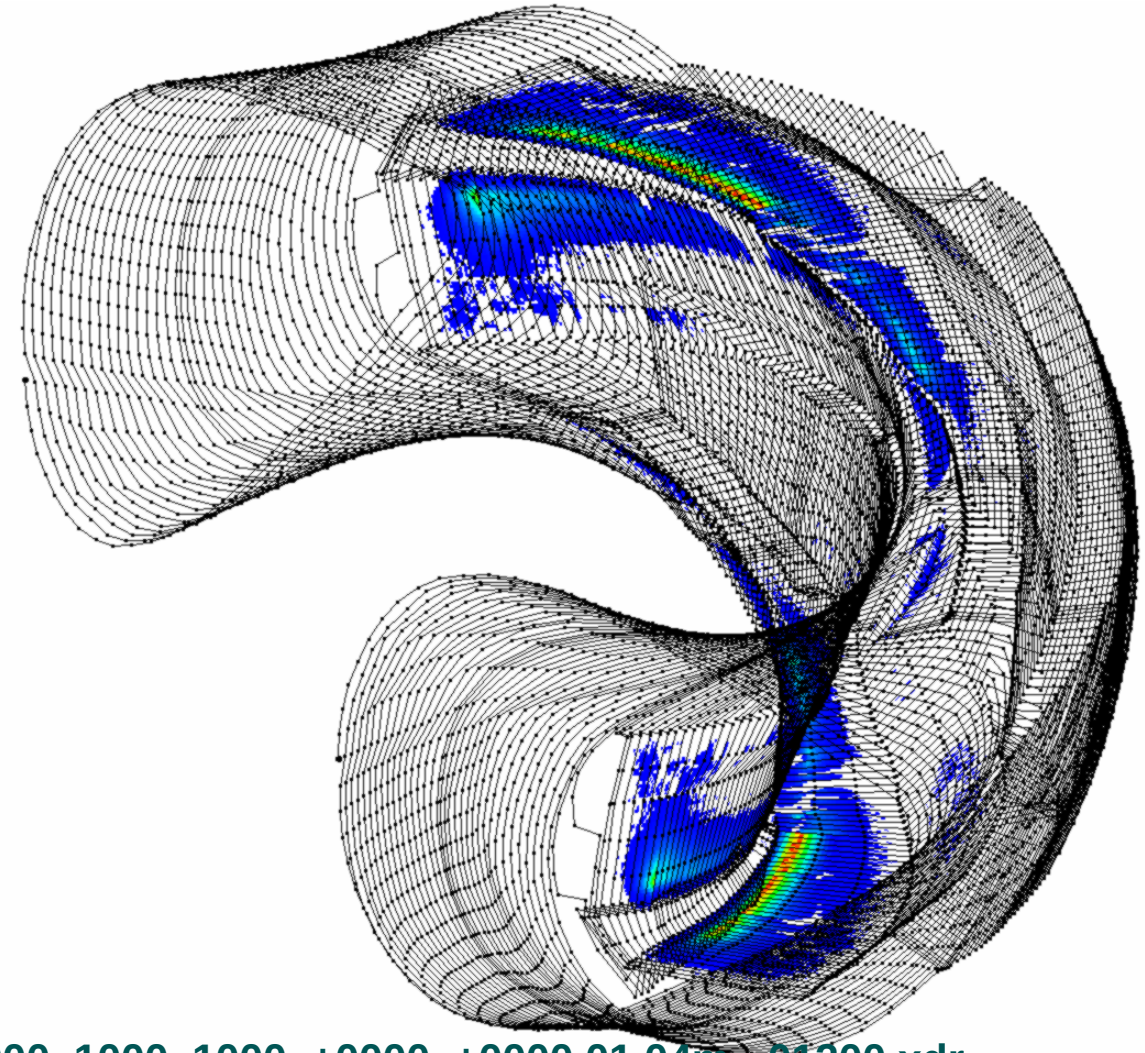
Originalgeometrie, Standard, Beta = 0,65 %, Itor = -12 kA



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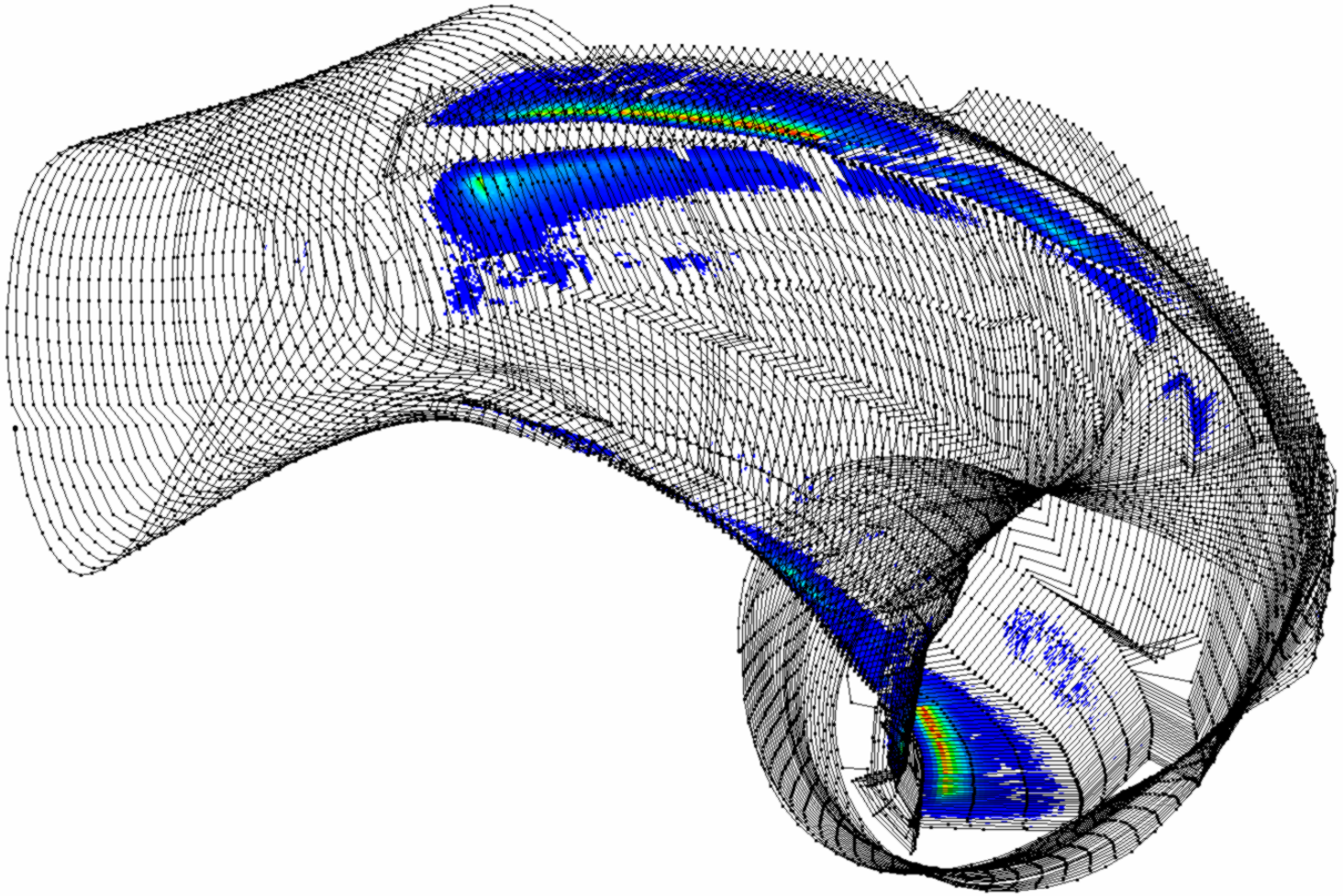
Originalgeometrie, Standard, Beta = 0,65 %, Itor = -12 kA



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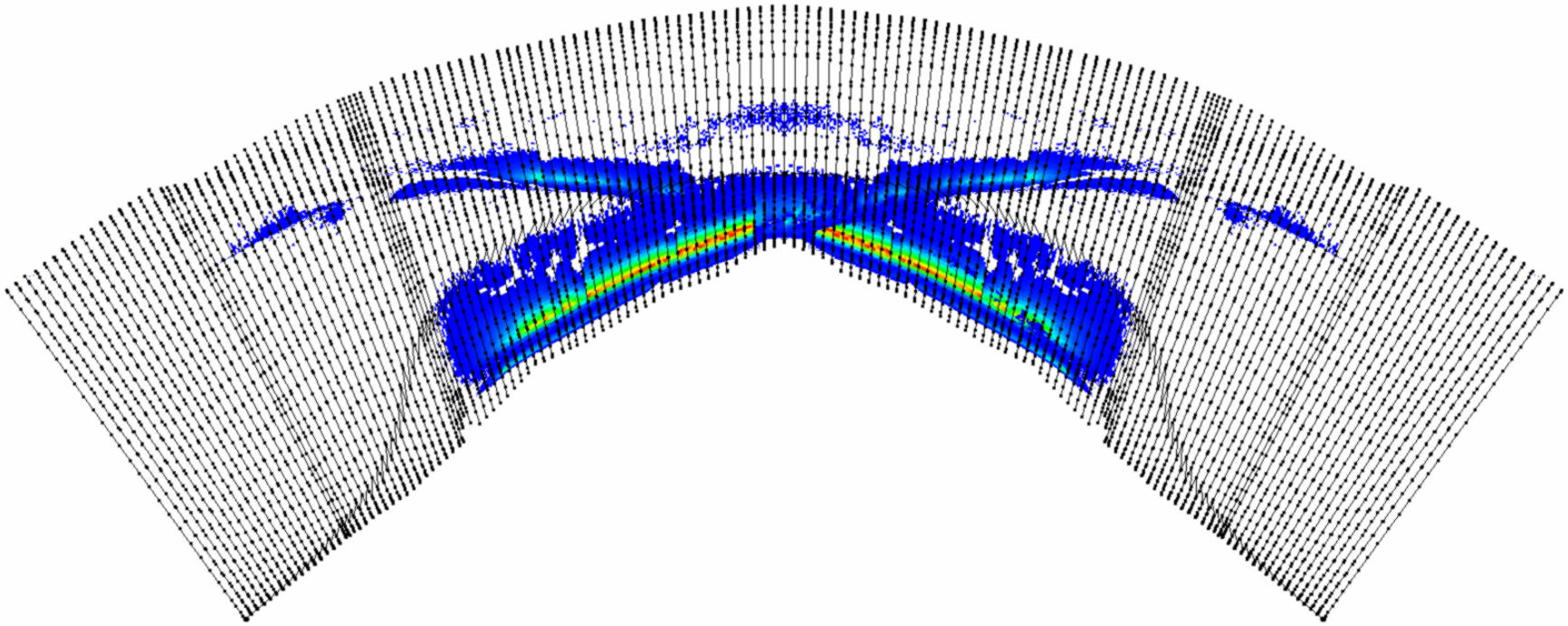
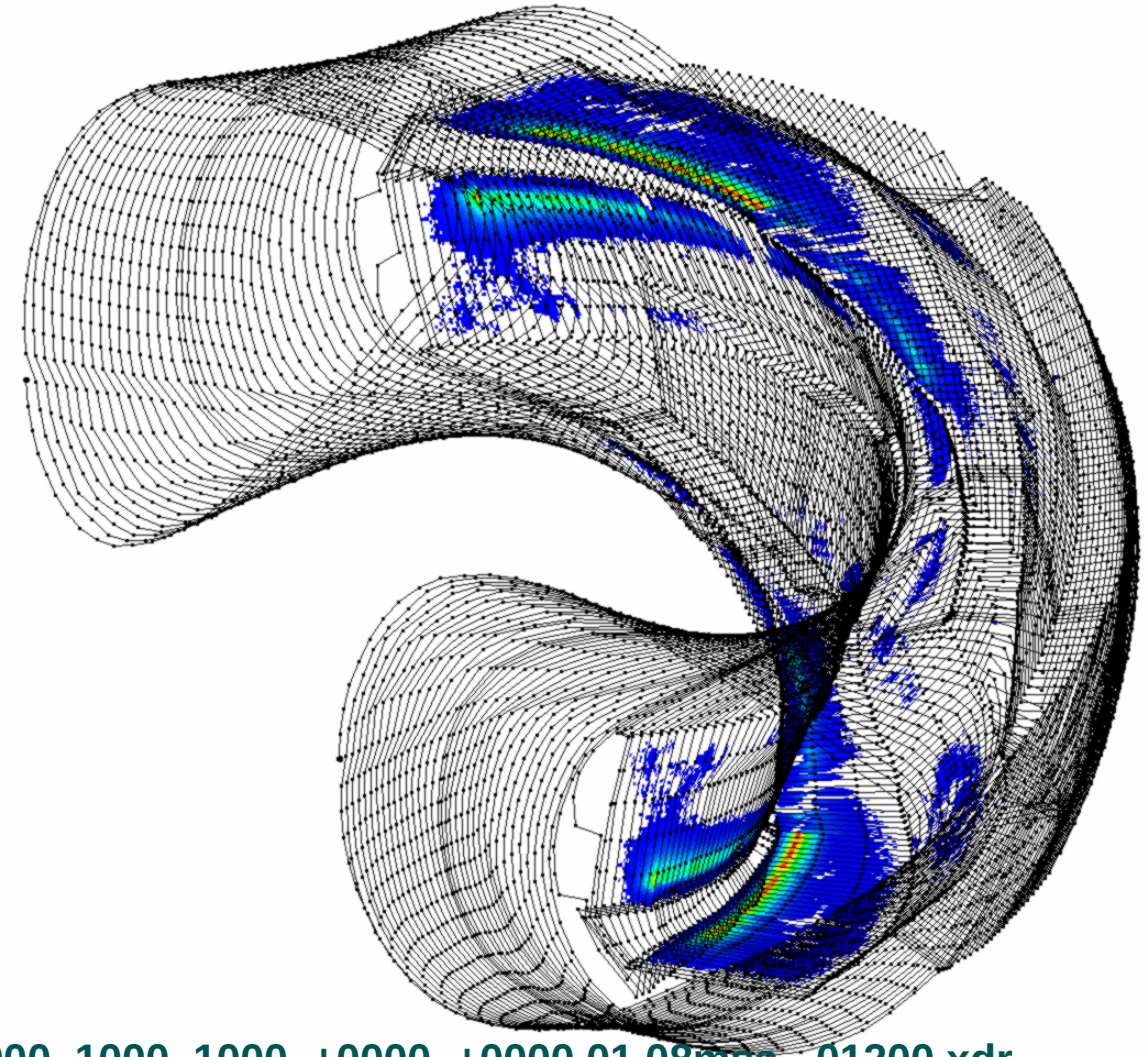
Originalgeometrie, Standard, Beta = 0,65 %, Itor = -12 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.04m_-01200.xdr

Originalgeometrie, Standard, Beta = 1,32 %, Itor = -12 kA



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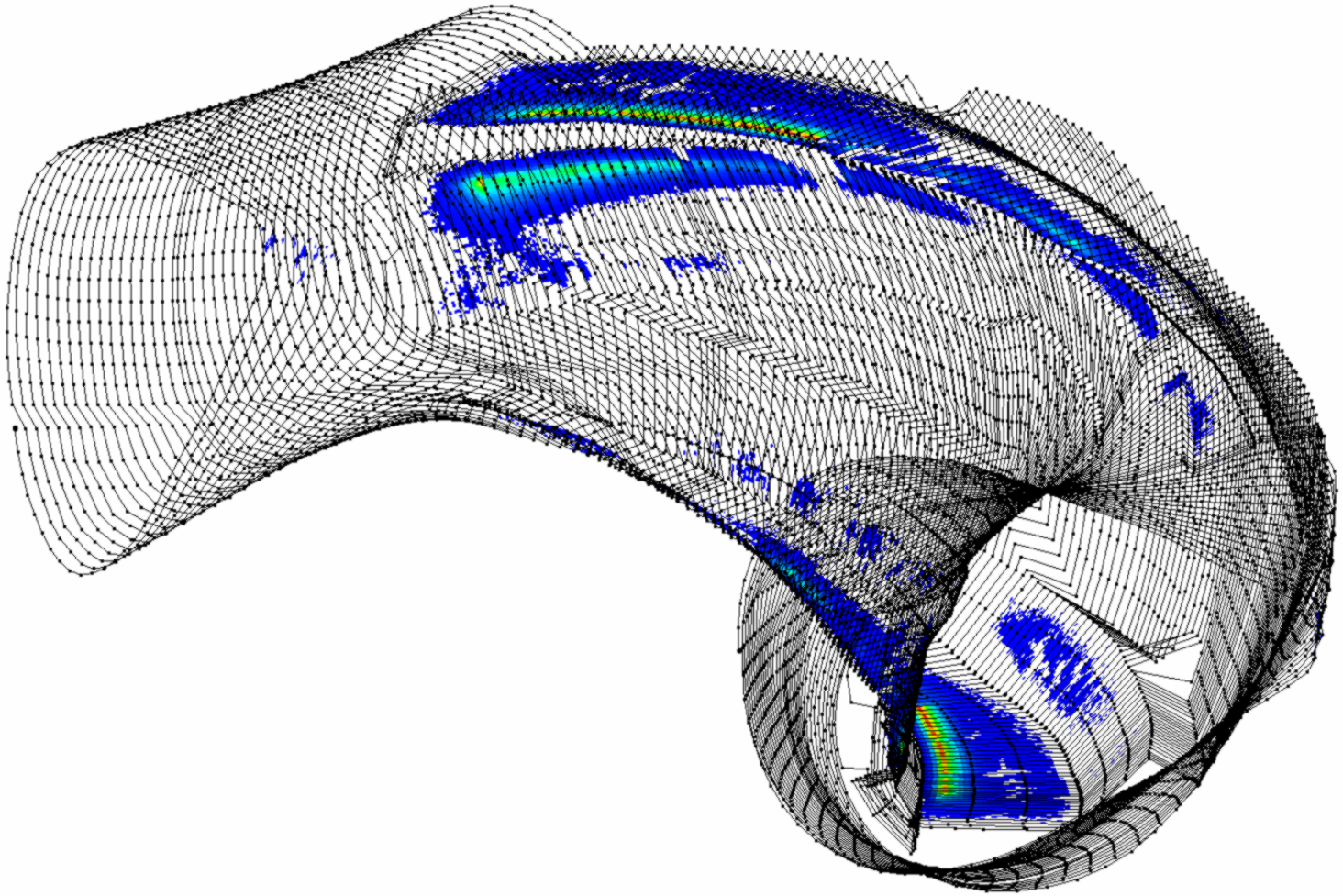
Originalgeometrie, Standard, Beta = 1,32 %, Itor = -12 kA



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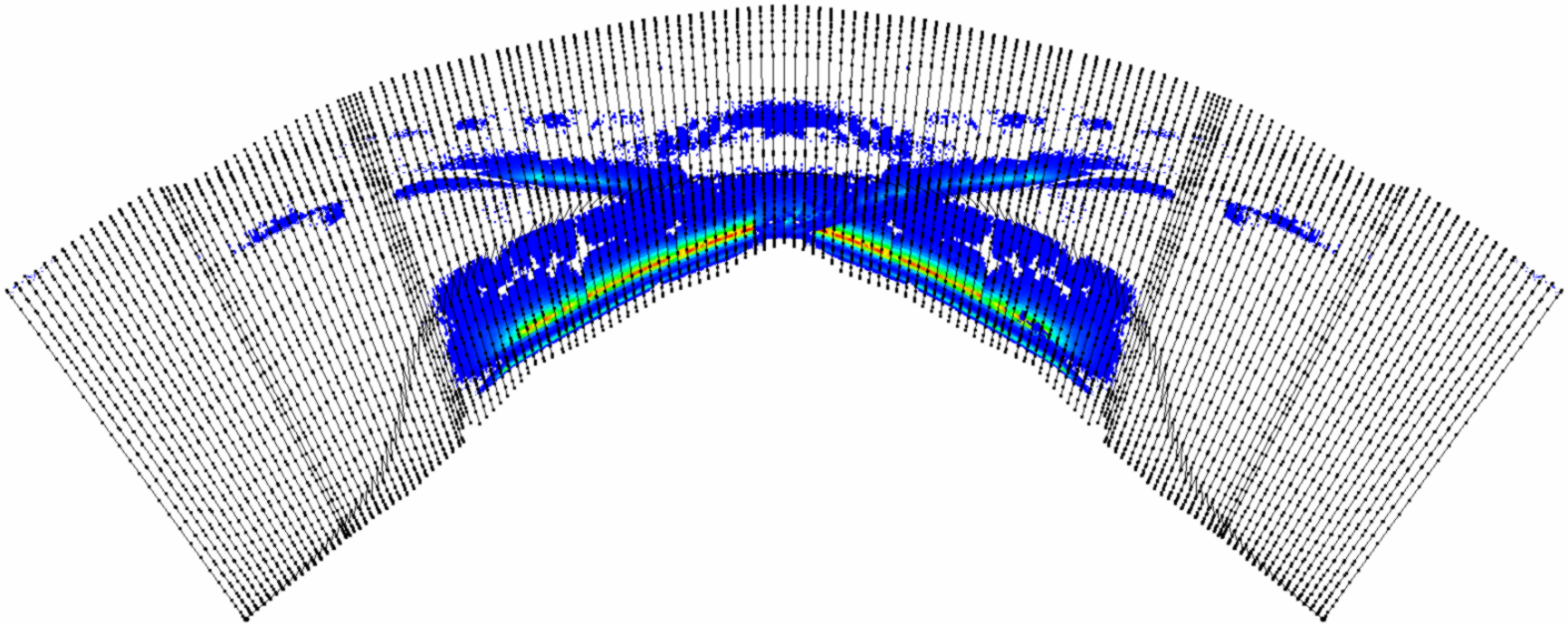
Originalgeometrie, Standard, Beta = 1,32 %, Itor = -12 kA



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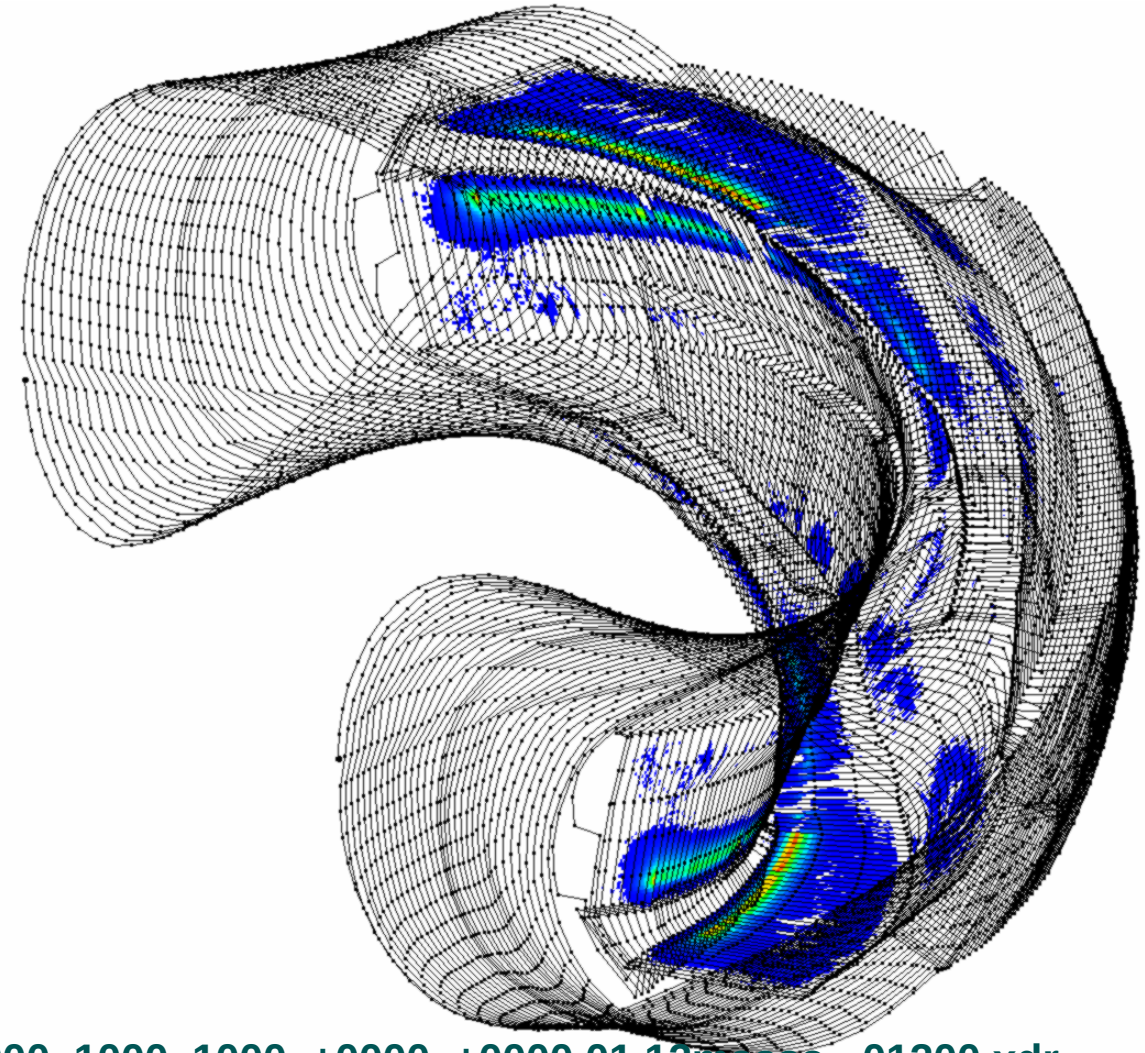
Originalgeometrie, Standard, Beta = 2,0 %, Itor = -12 kA



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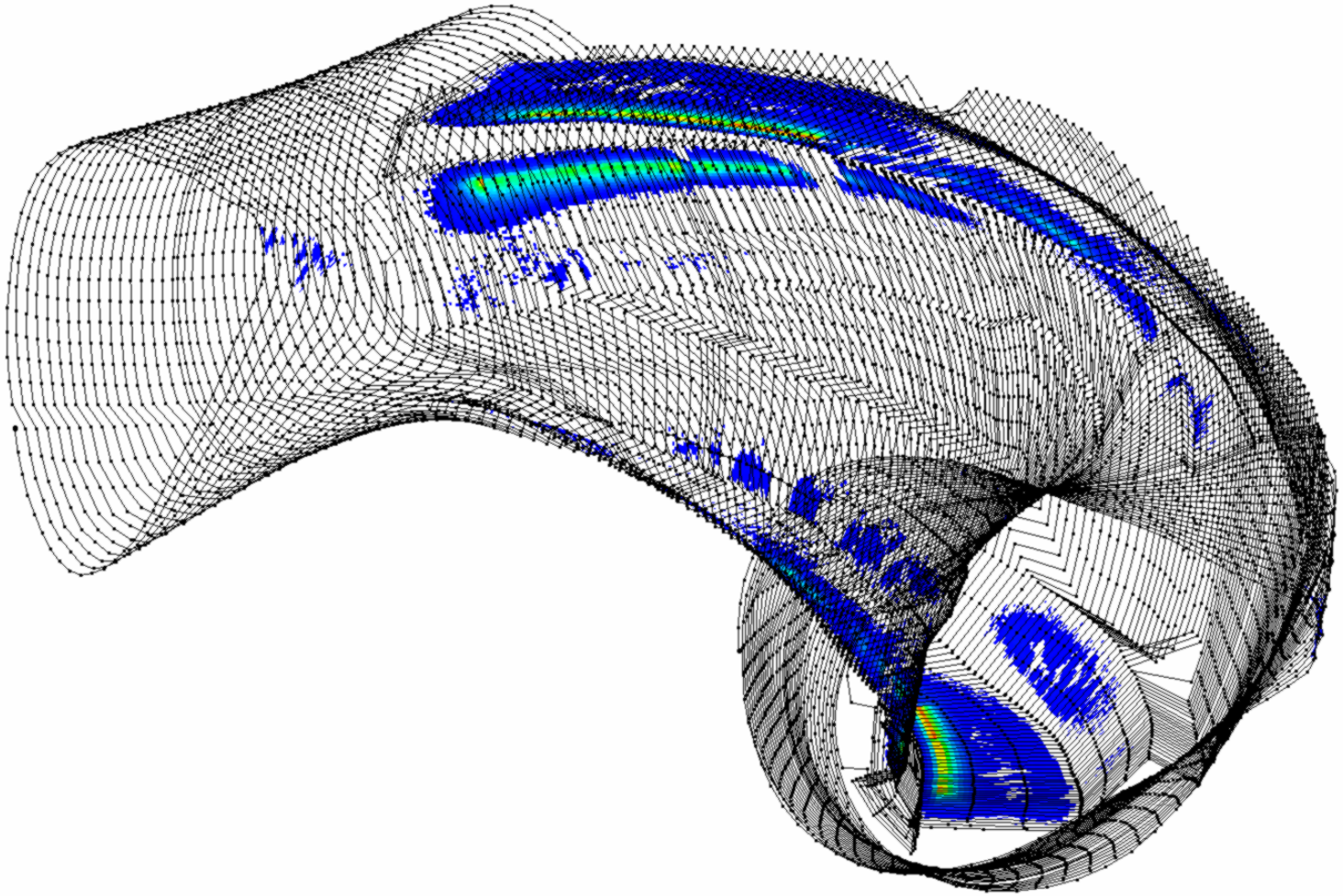
Originalgeometrie, Standard, Beta = 2,0 %, Itor = -12 kA



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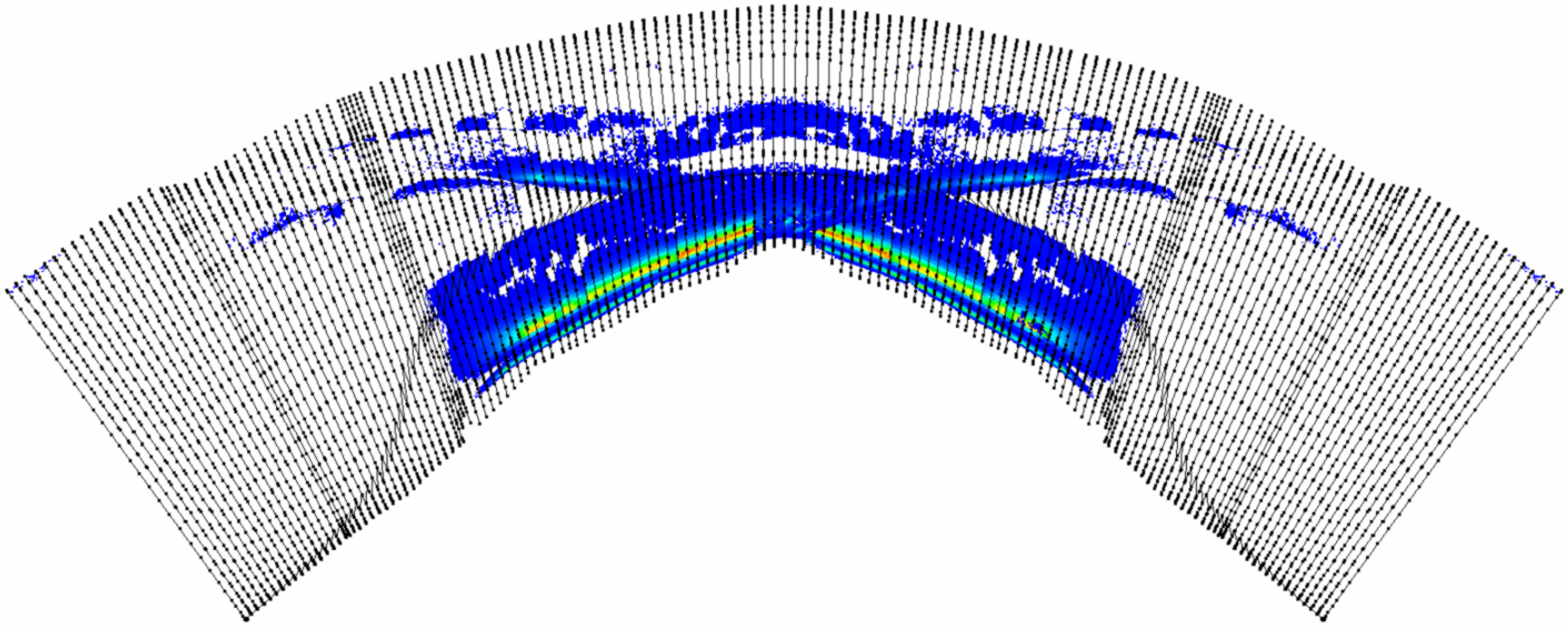
Originalgeometrie, Standard, Beta = 2,0 %, Itor = -12 kA



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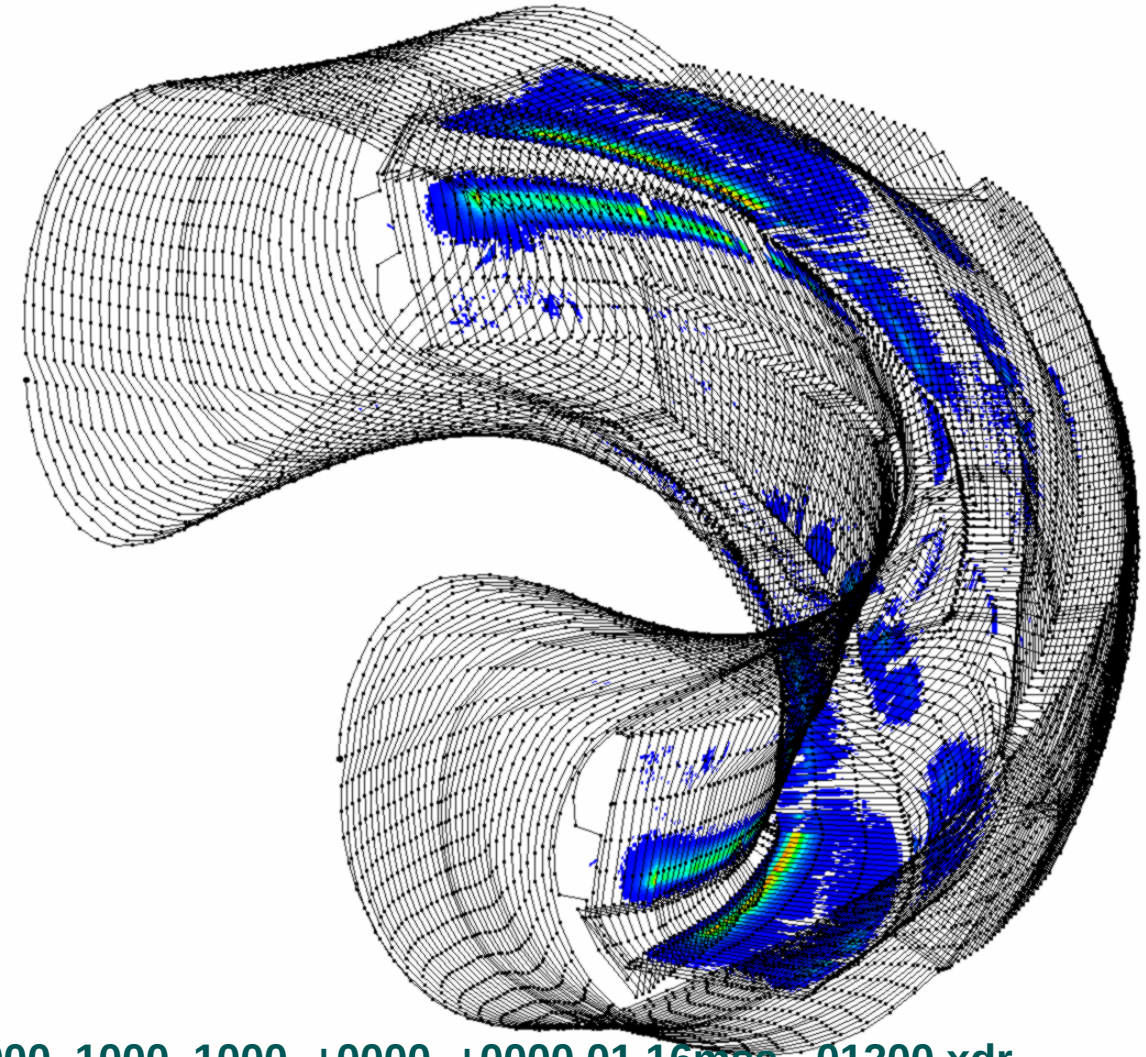
Originalgeometrie, Standard, Beta = 2,69 %, Itor = -12 kA



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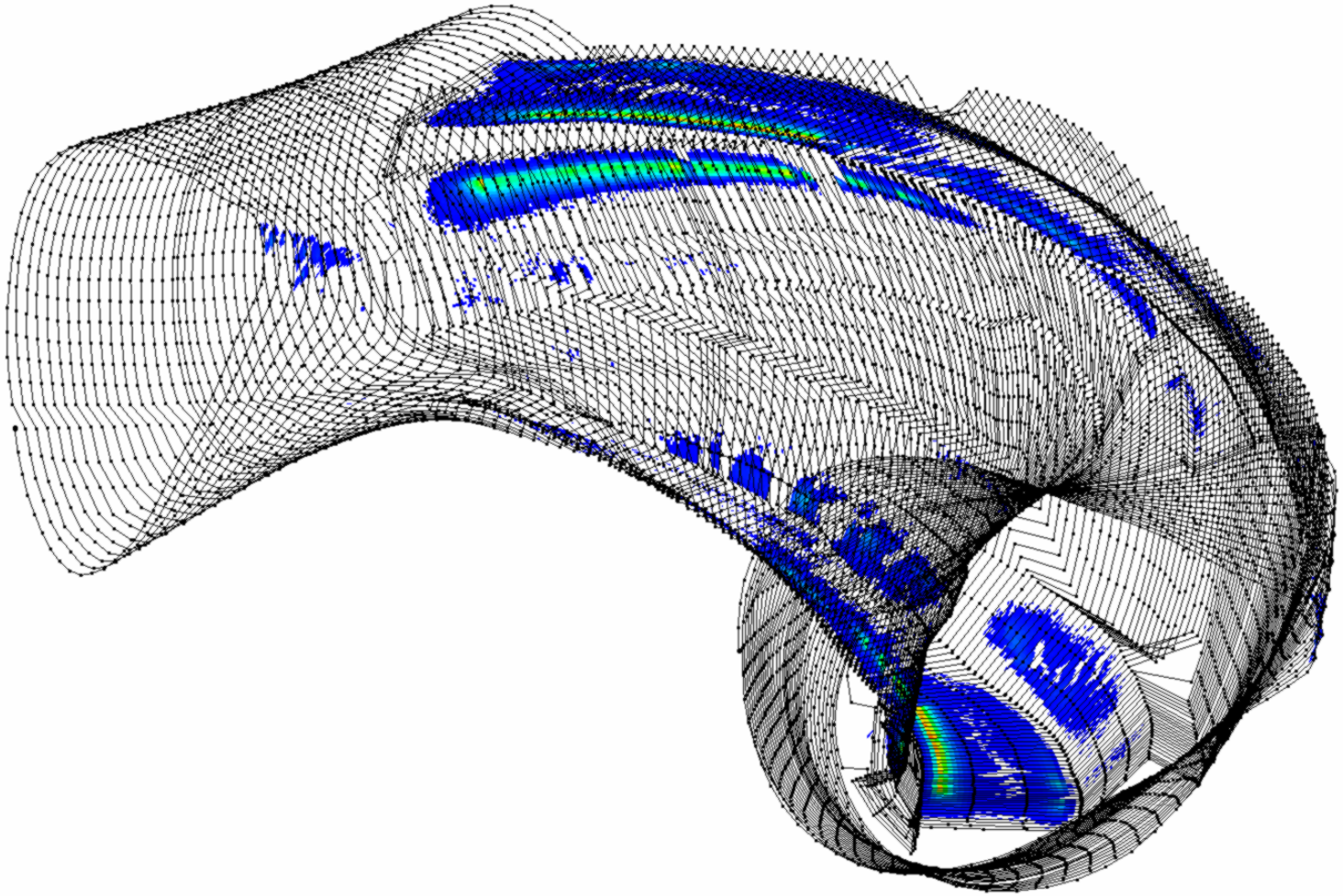
Originalgeometrie, Standard, Beta = 2,69 %, Itor = -12 kA



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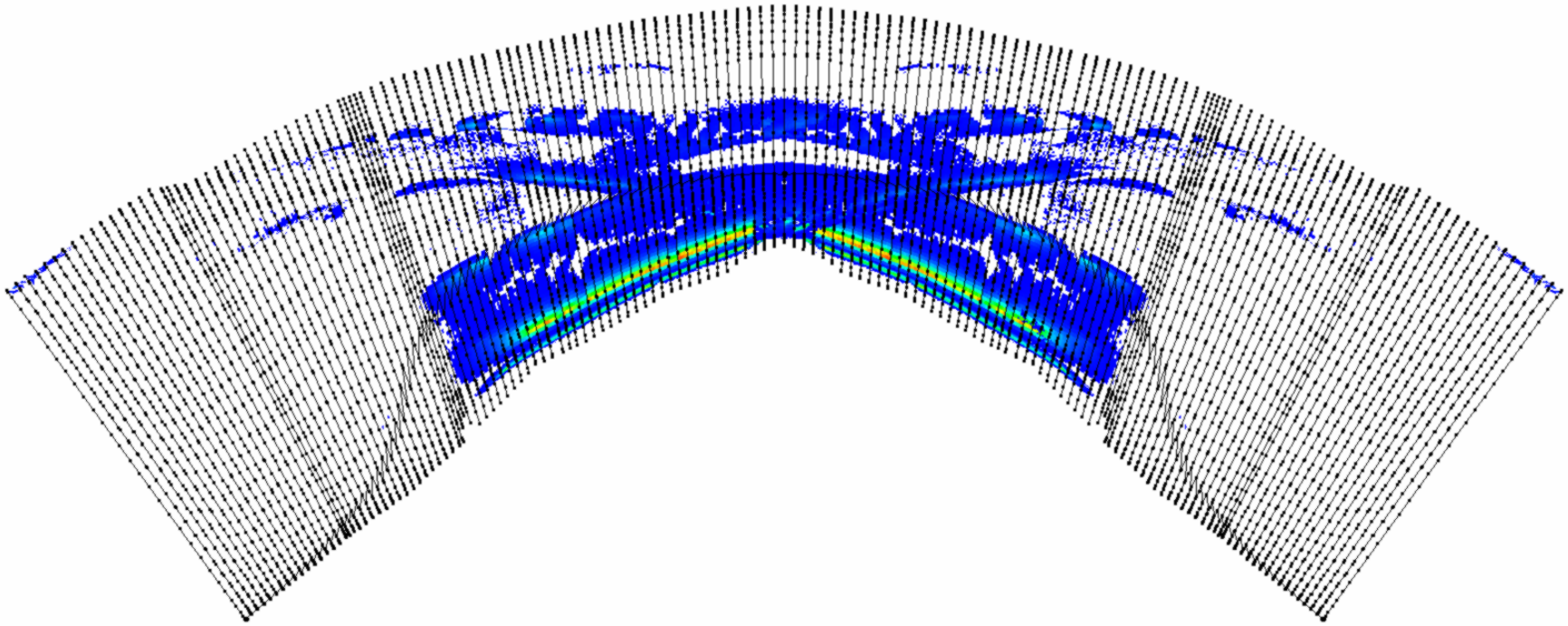
Originalgeometrie, Standard, Beta = 2,69 %, Itor = -12 kA



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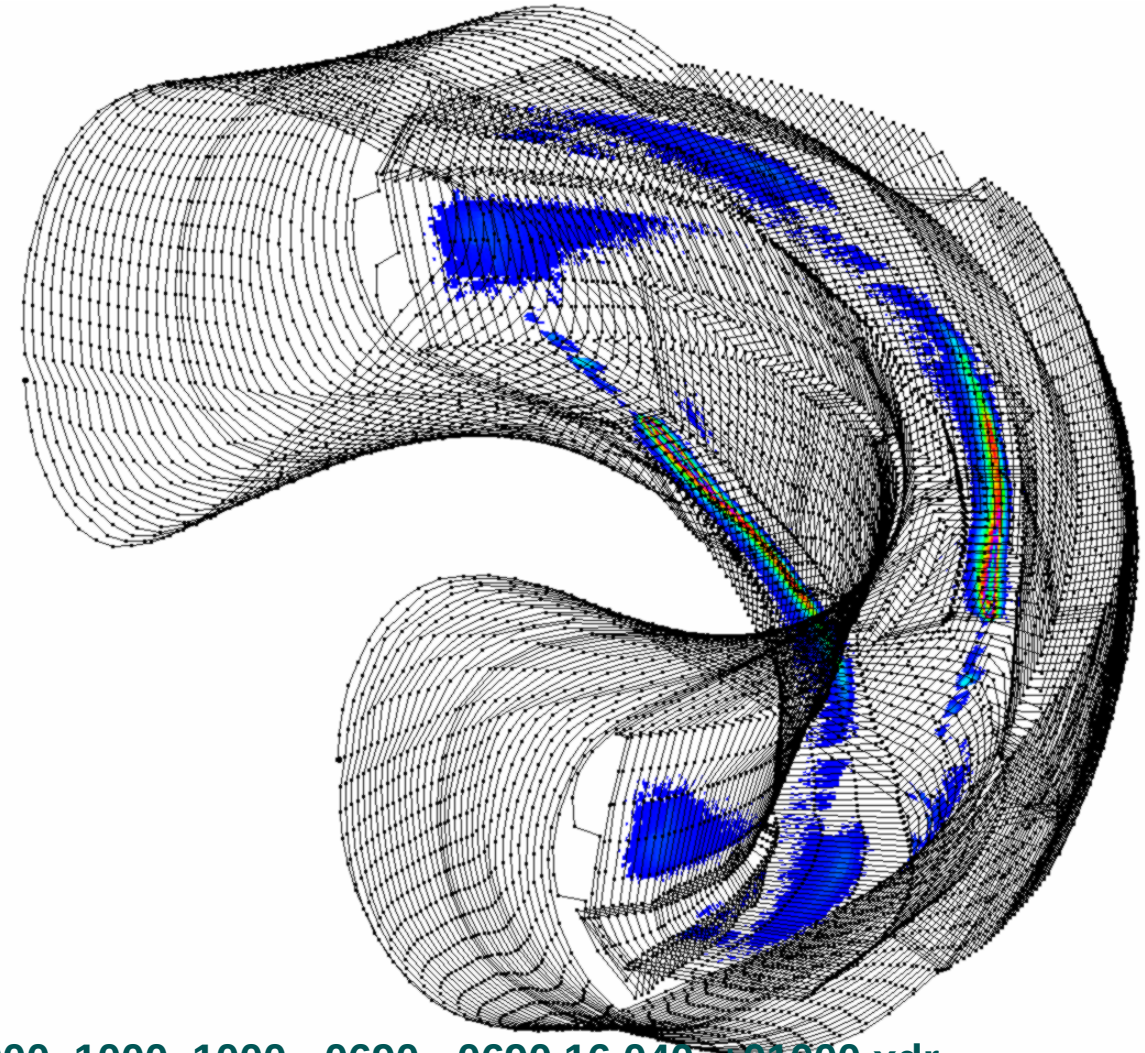
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 10 kA



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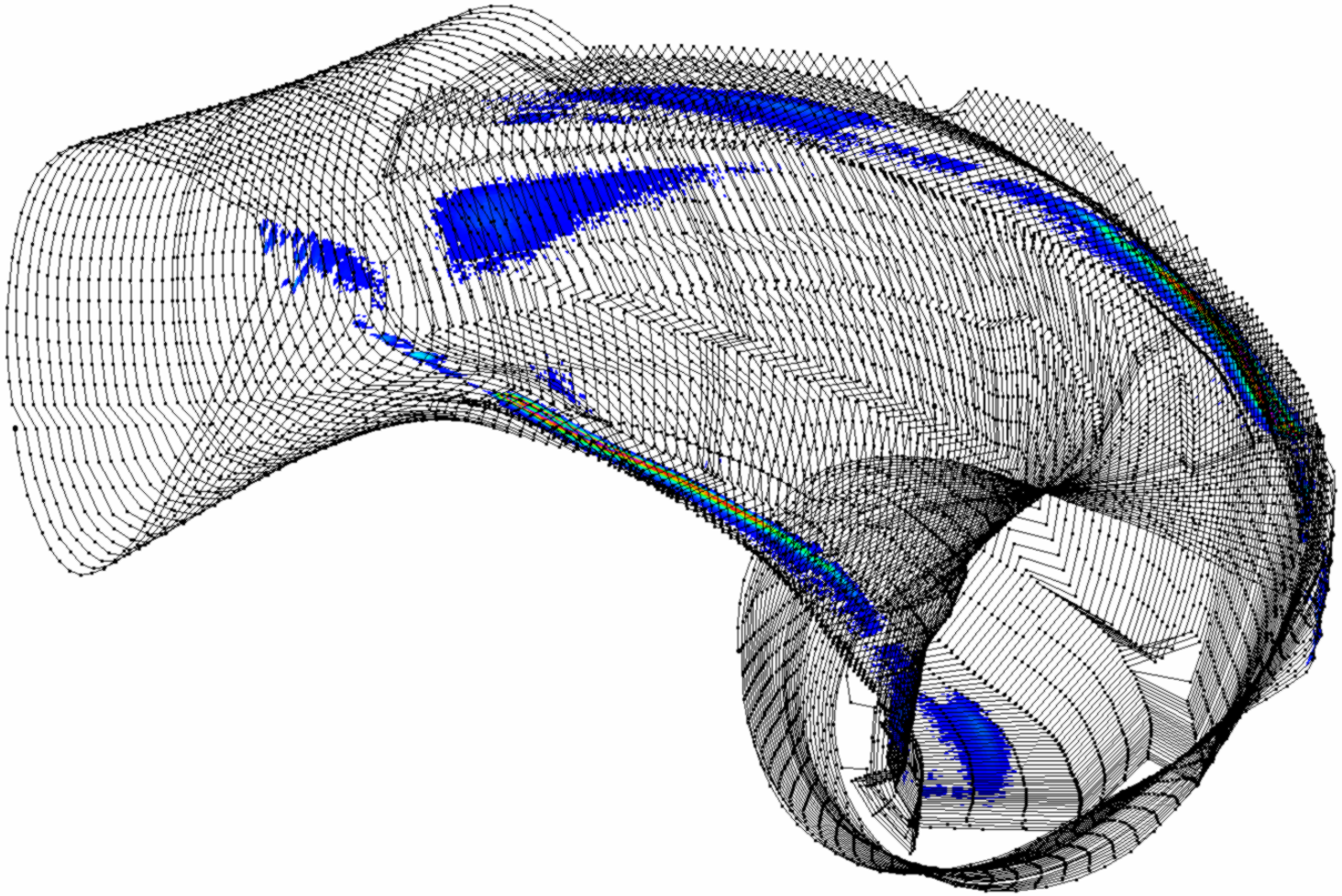
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 10 kA



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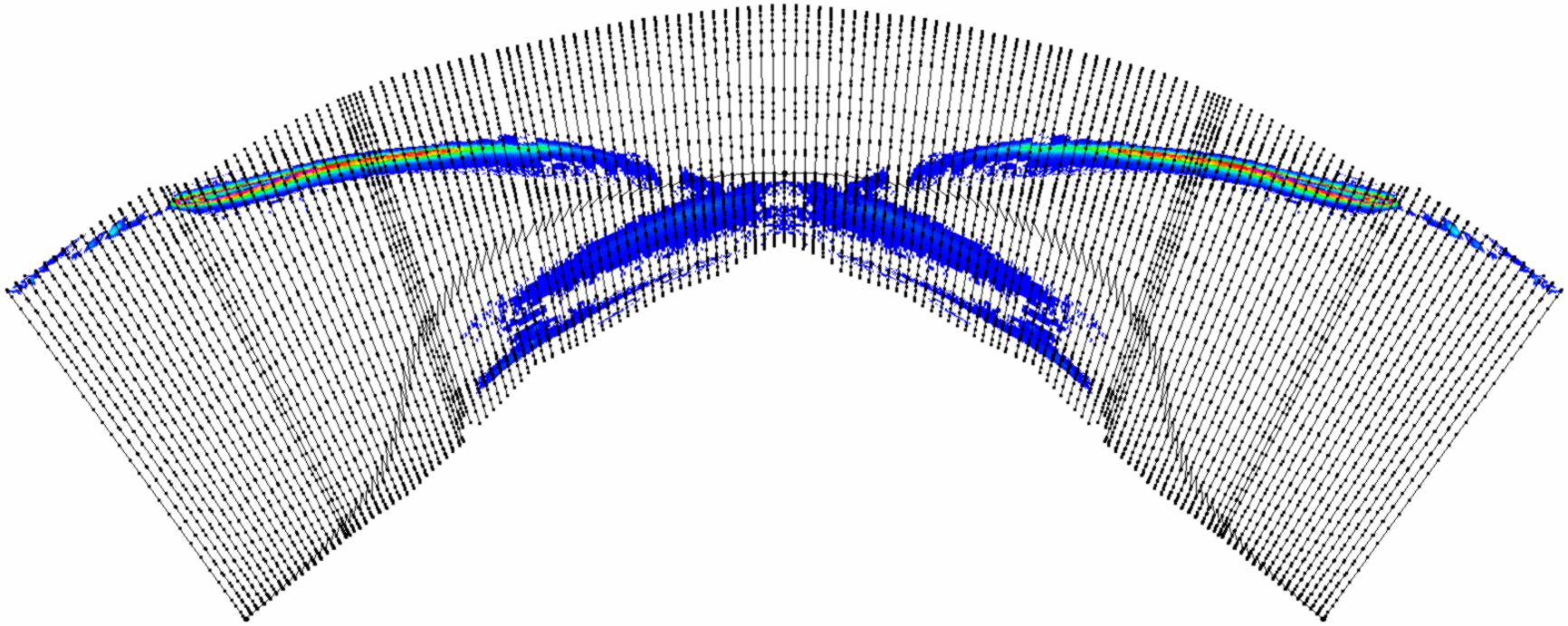
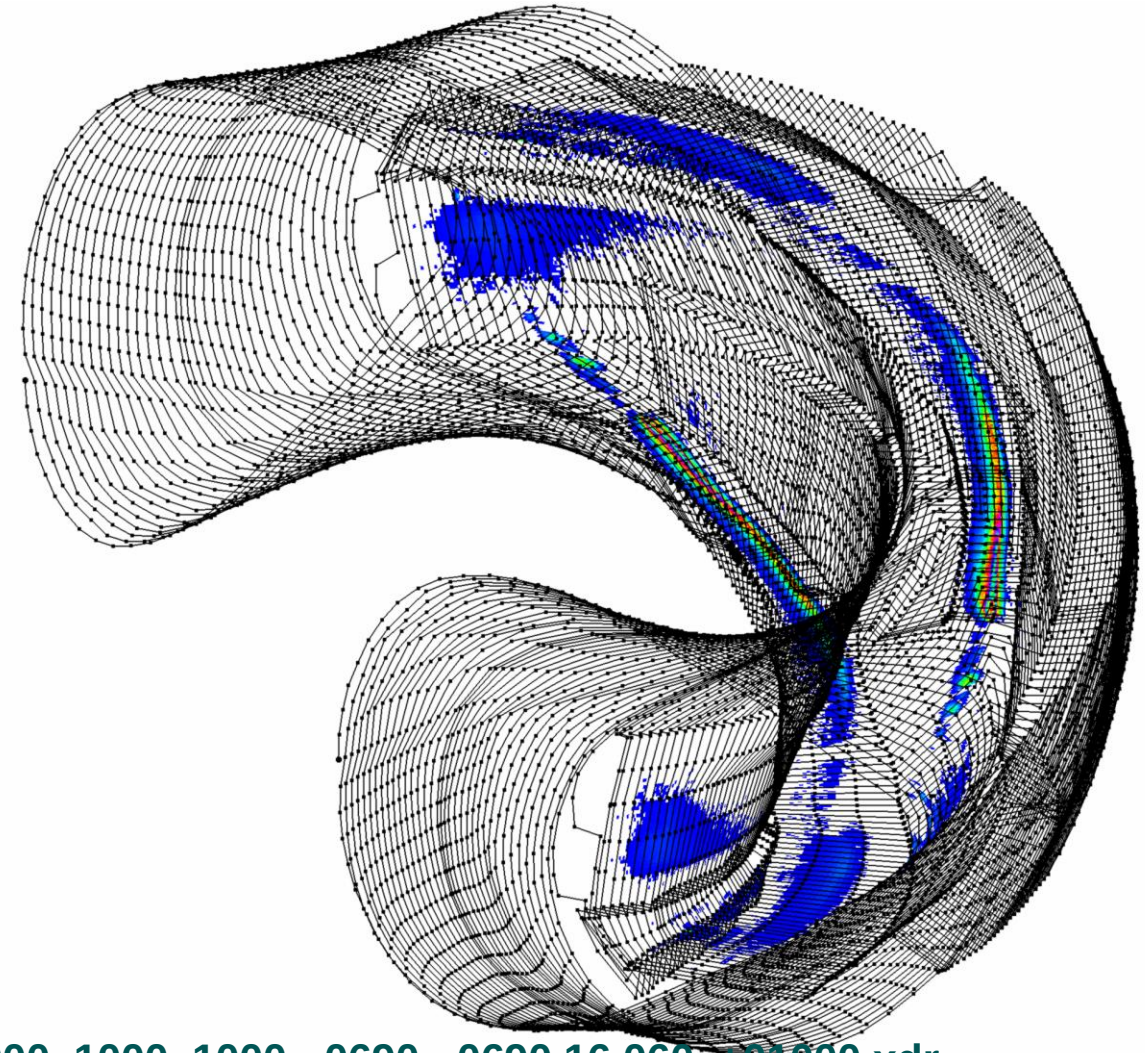
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 10 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.040_+01000.xdr

Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 10 kA



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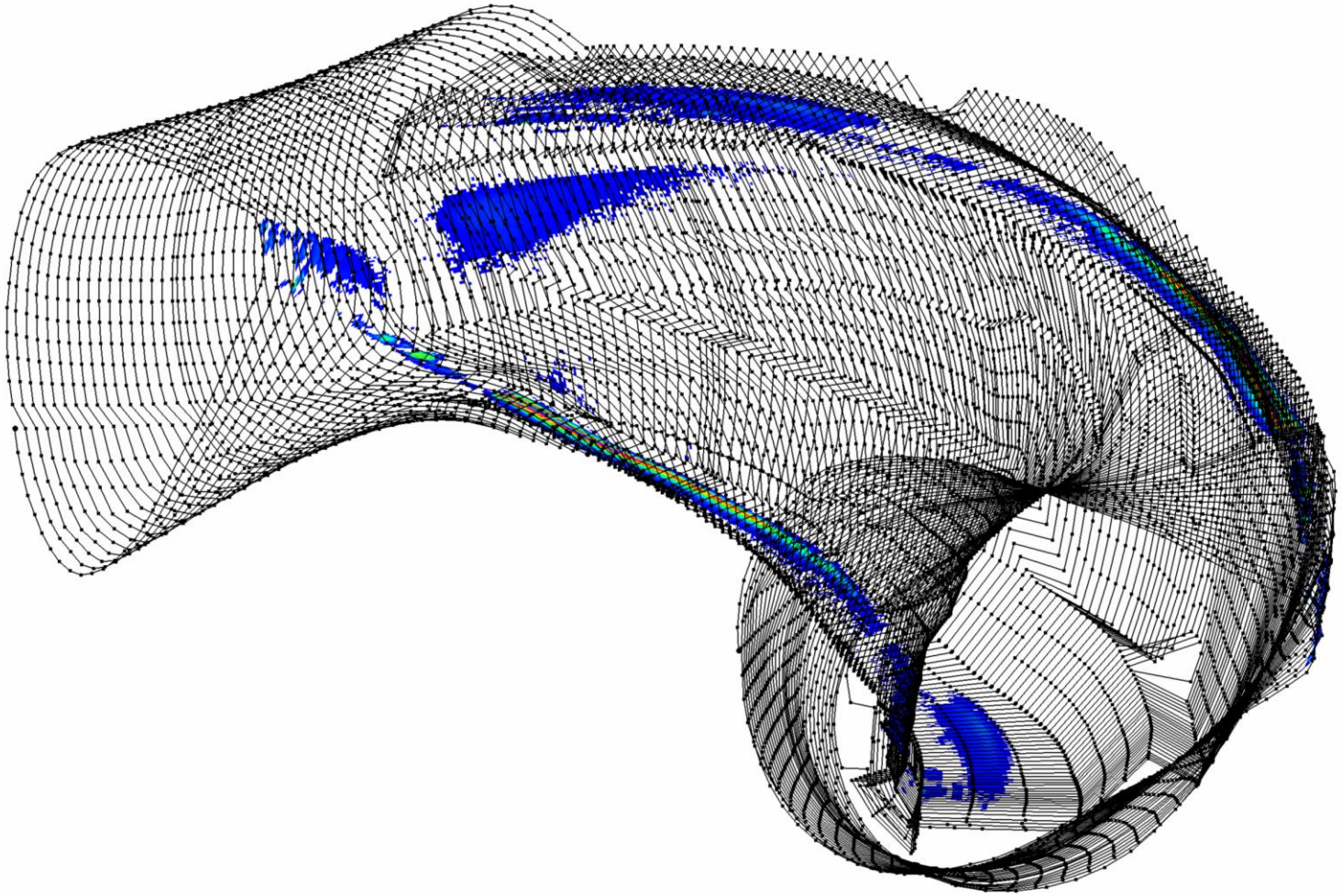
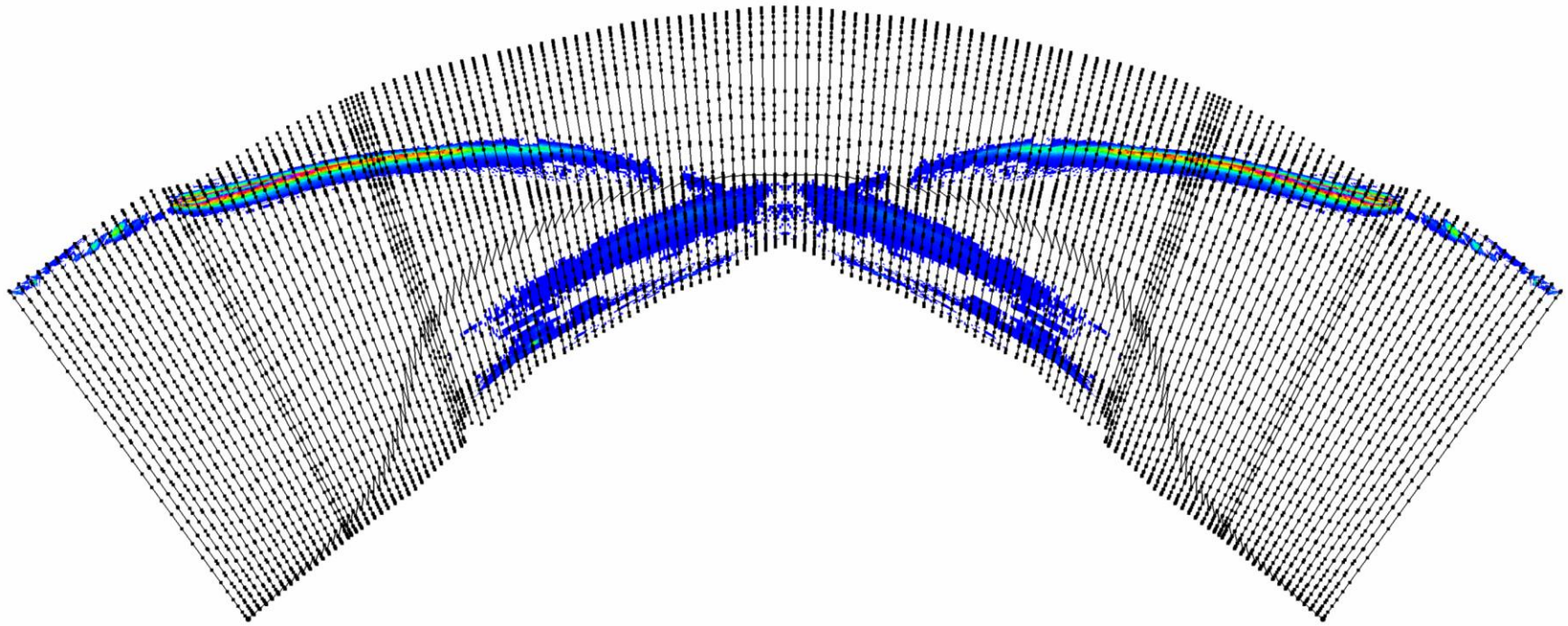
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 10 kA



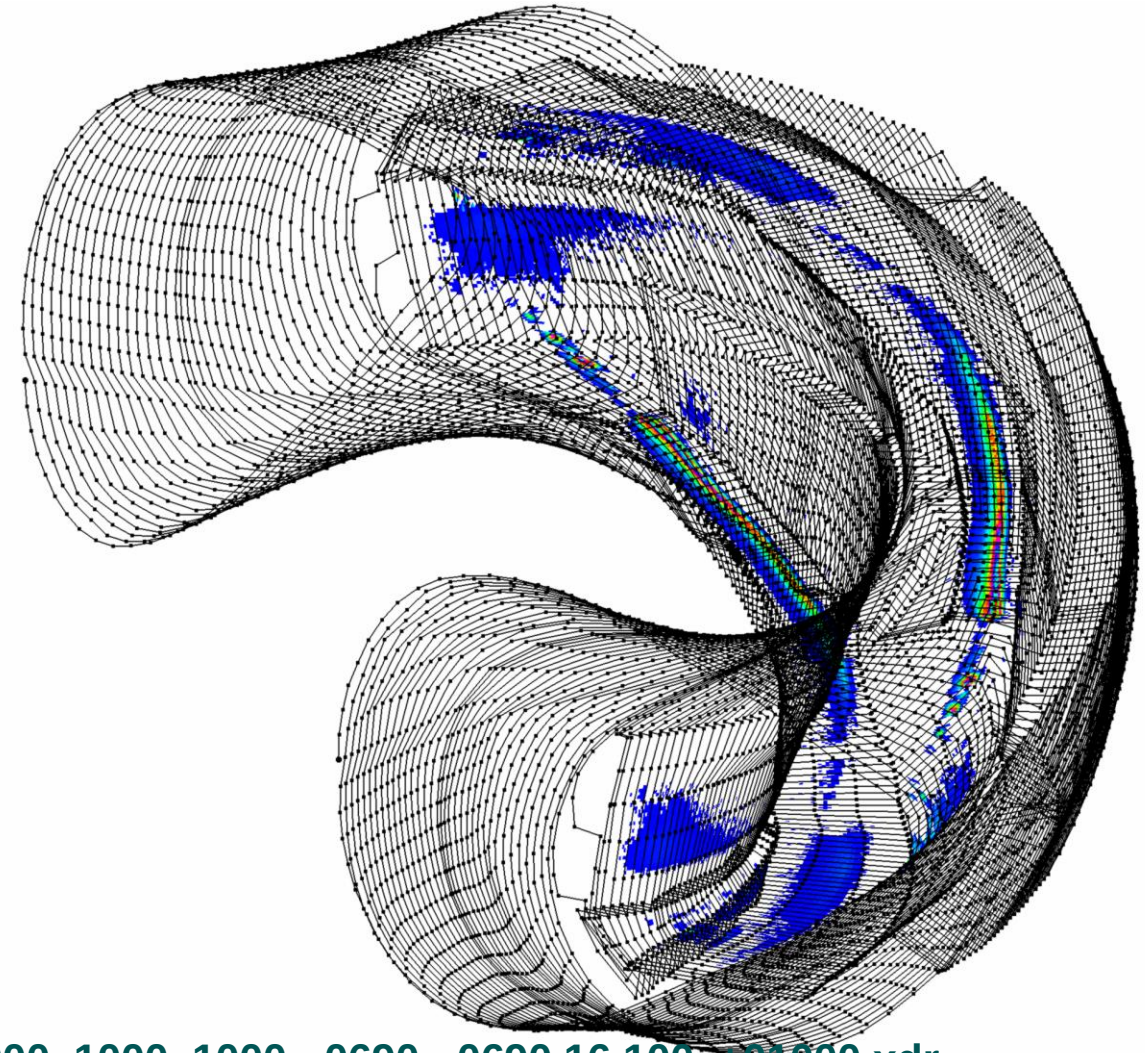
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_+01000.xdr

Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 10 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_+01000.xdr

Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 10 kA



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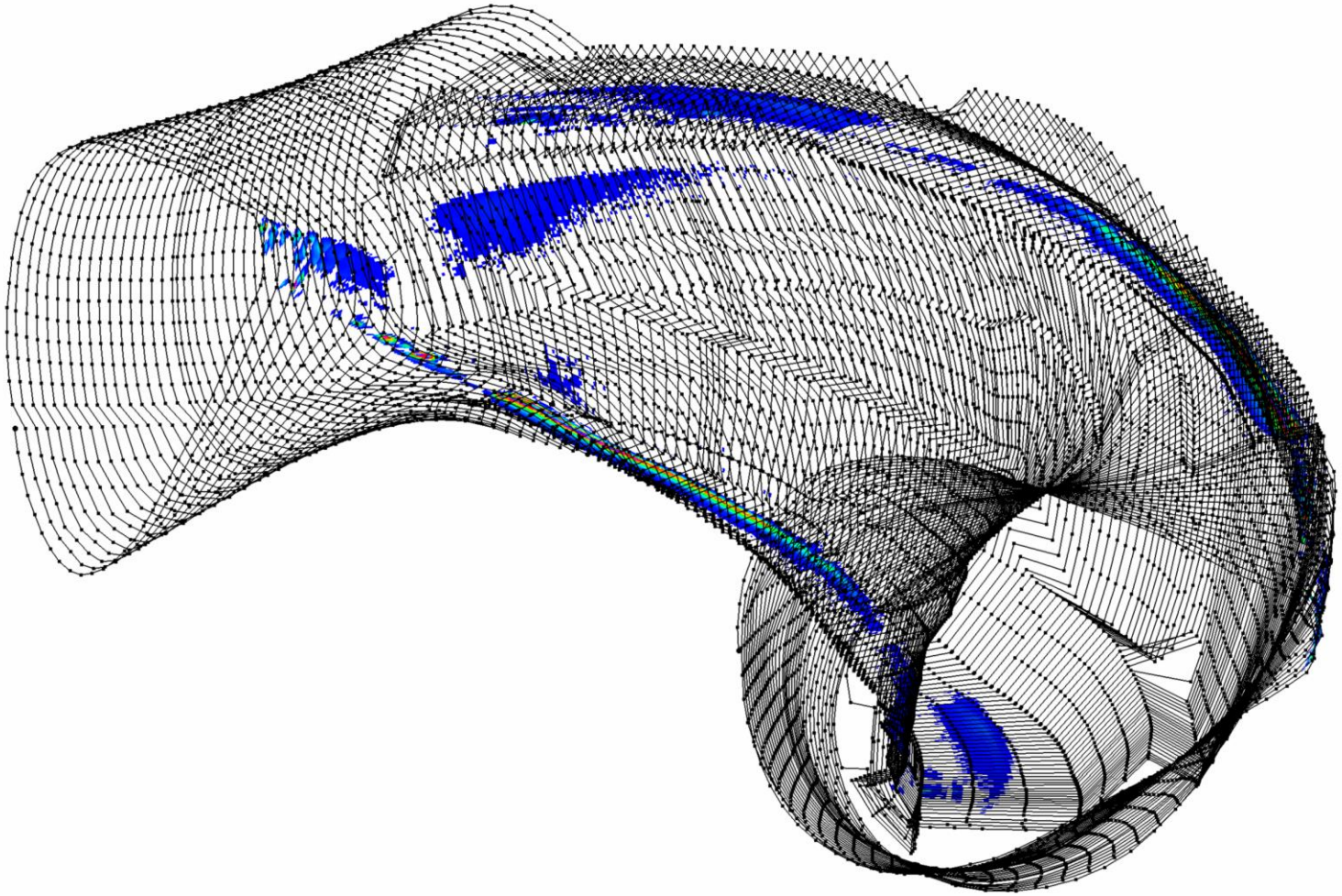
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 10 kA



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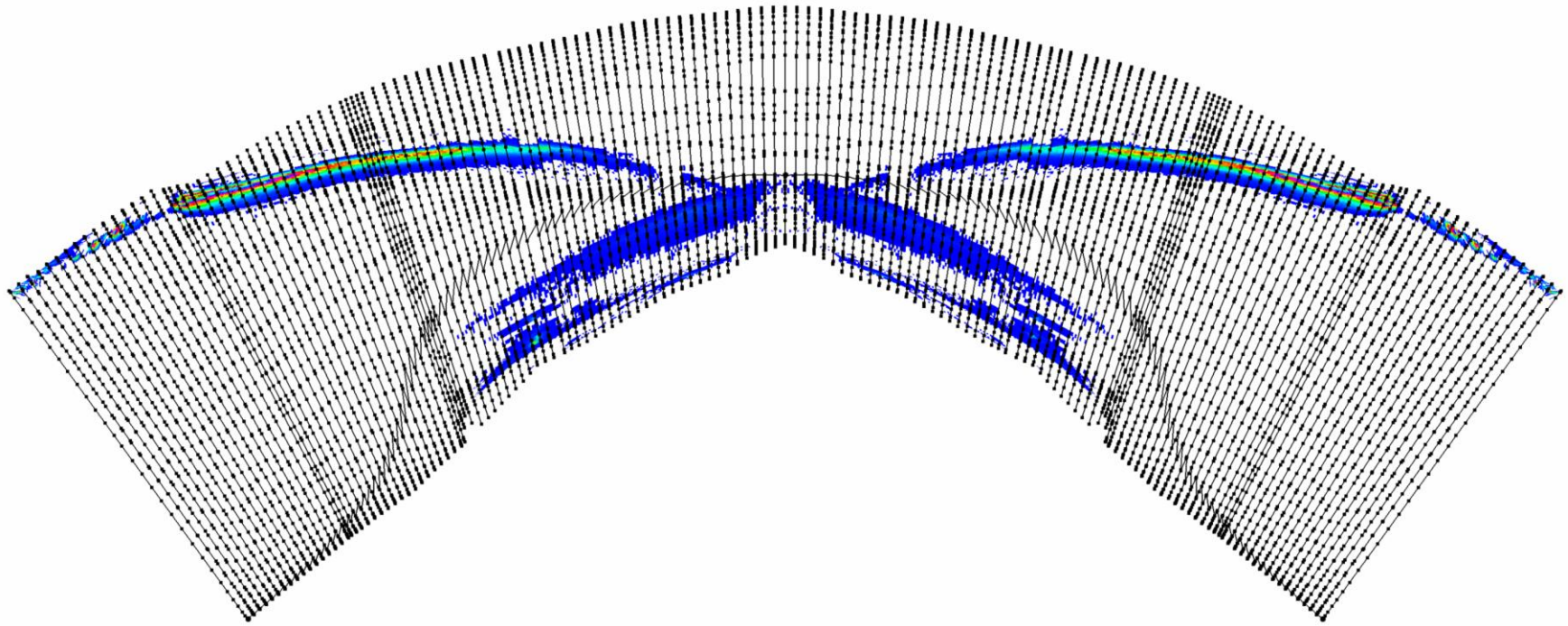
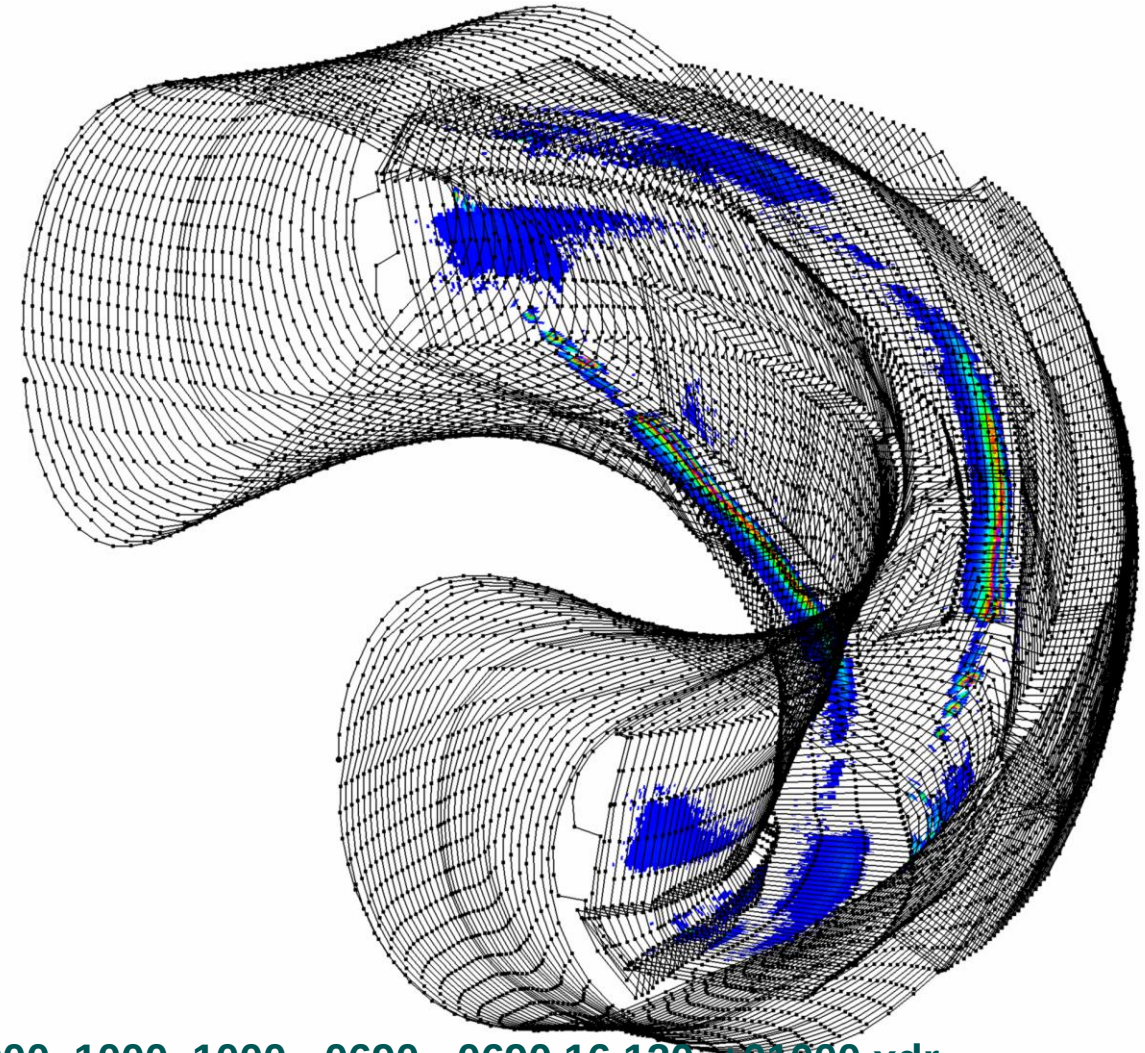
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 10 kA



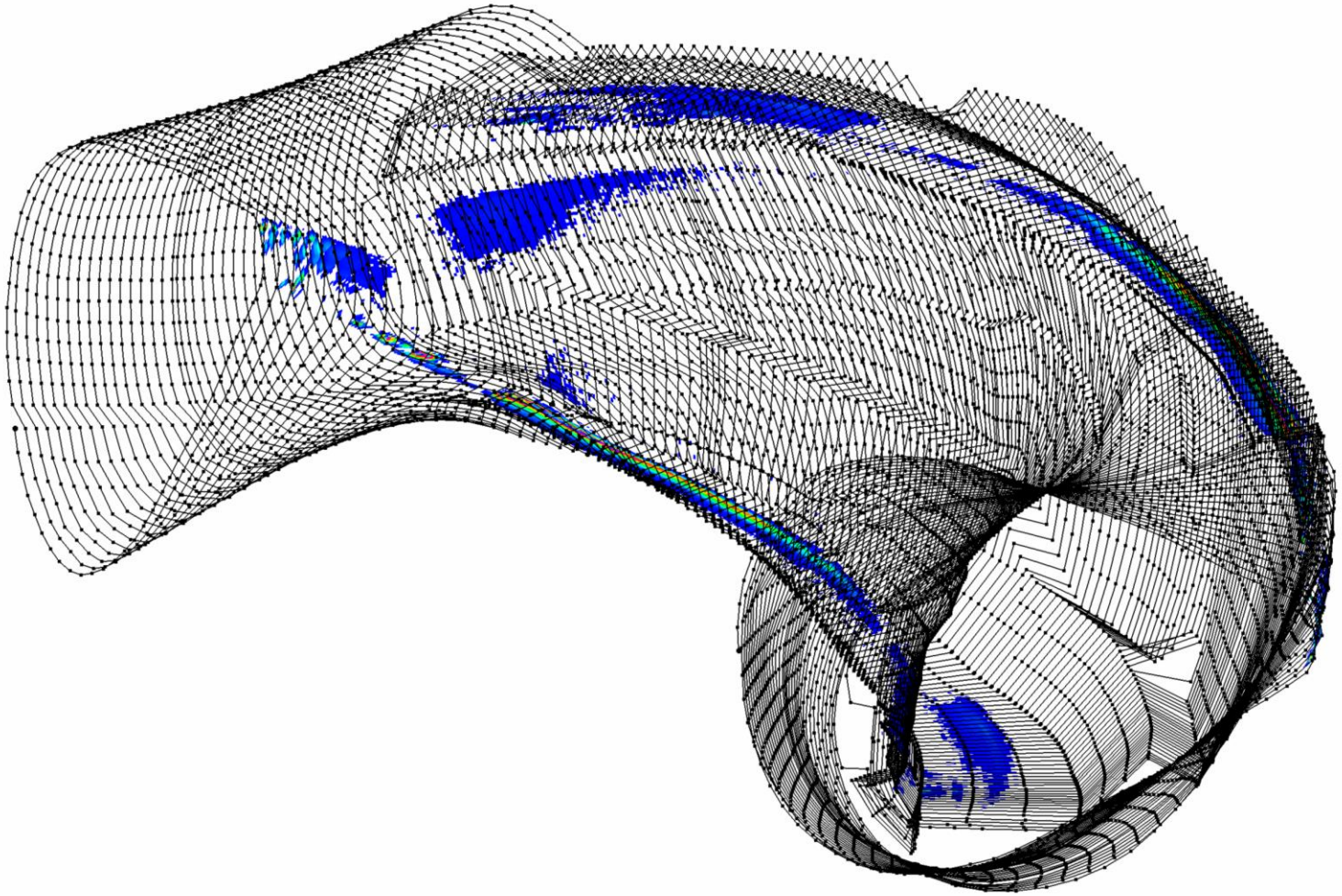
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.100_+01000.xdr

Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 10 kA



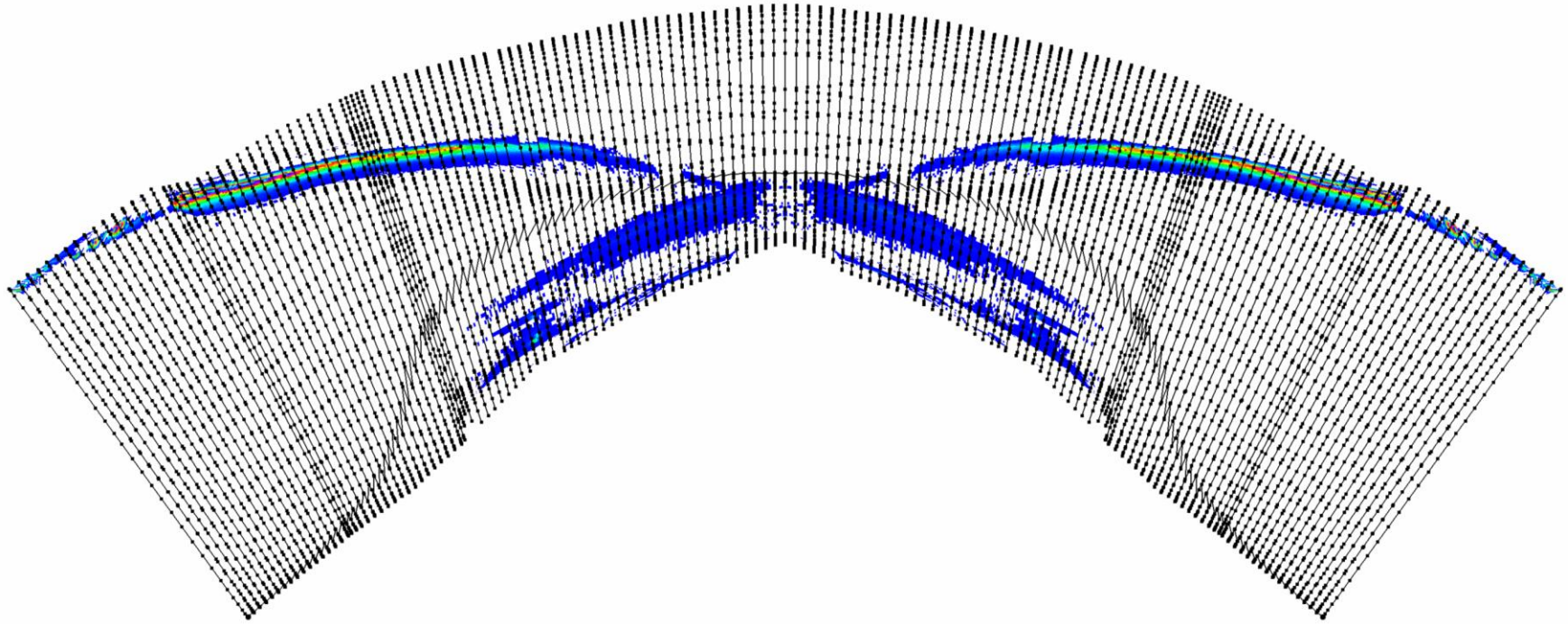
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_+01000.xdr

Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 10 kA



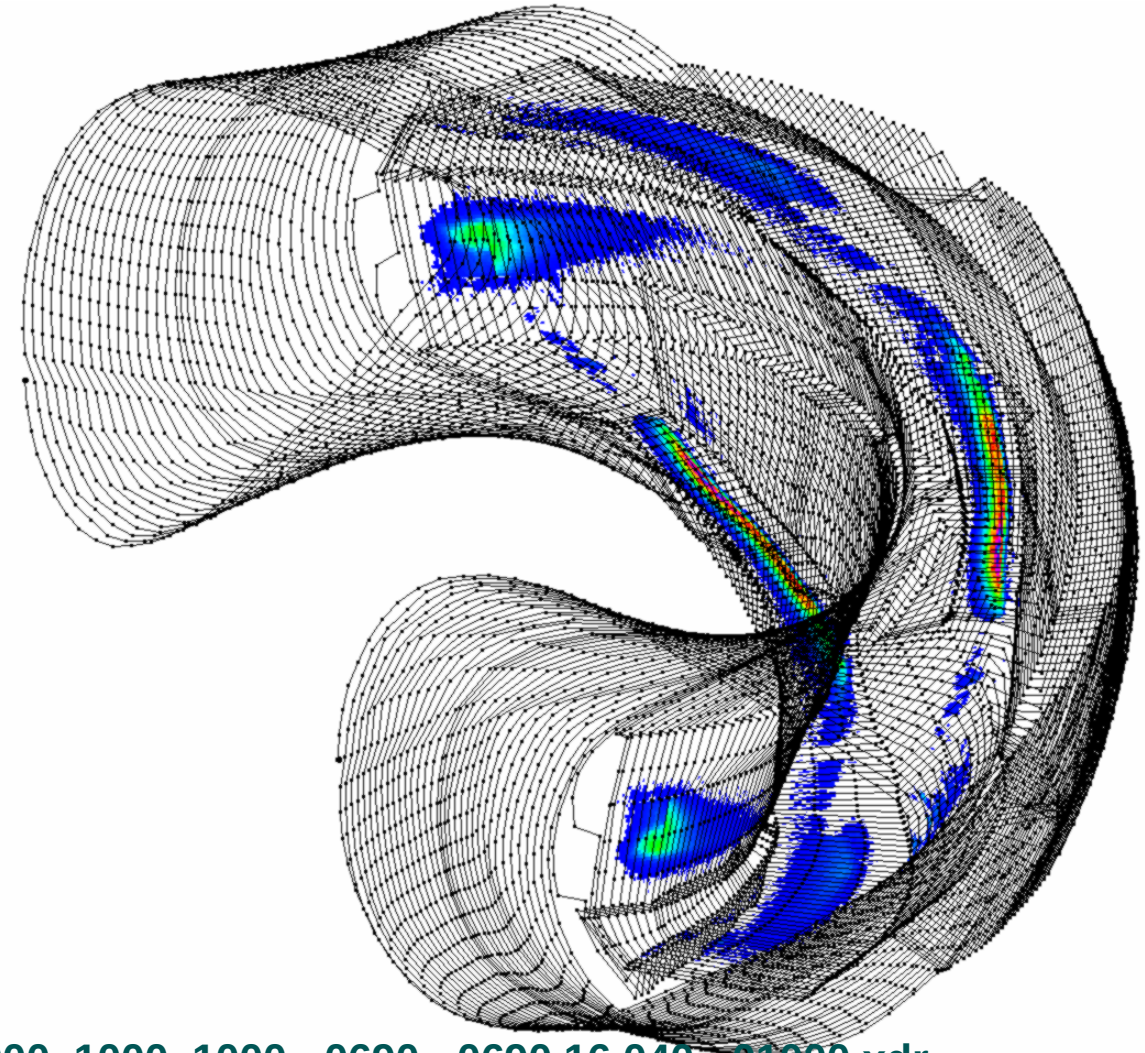
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_+01000.xdr

Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 10 kA



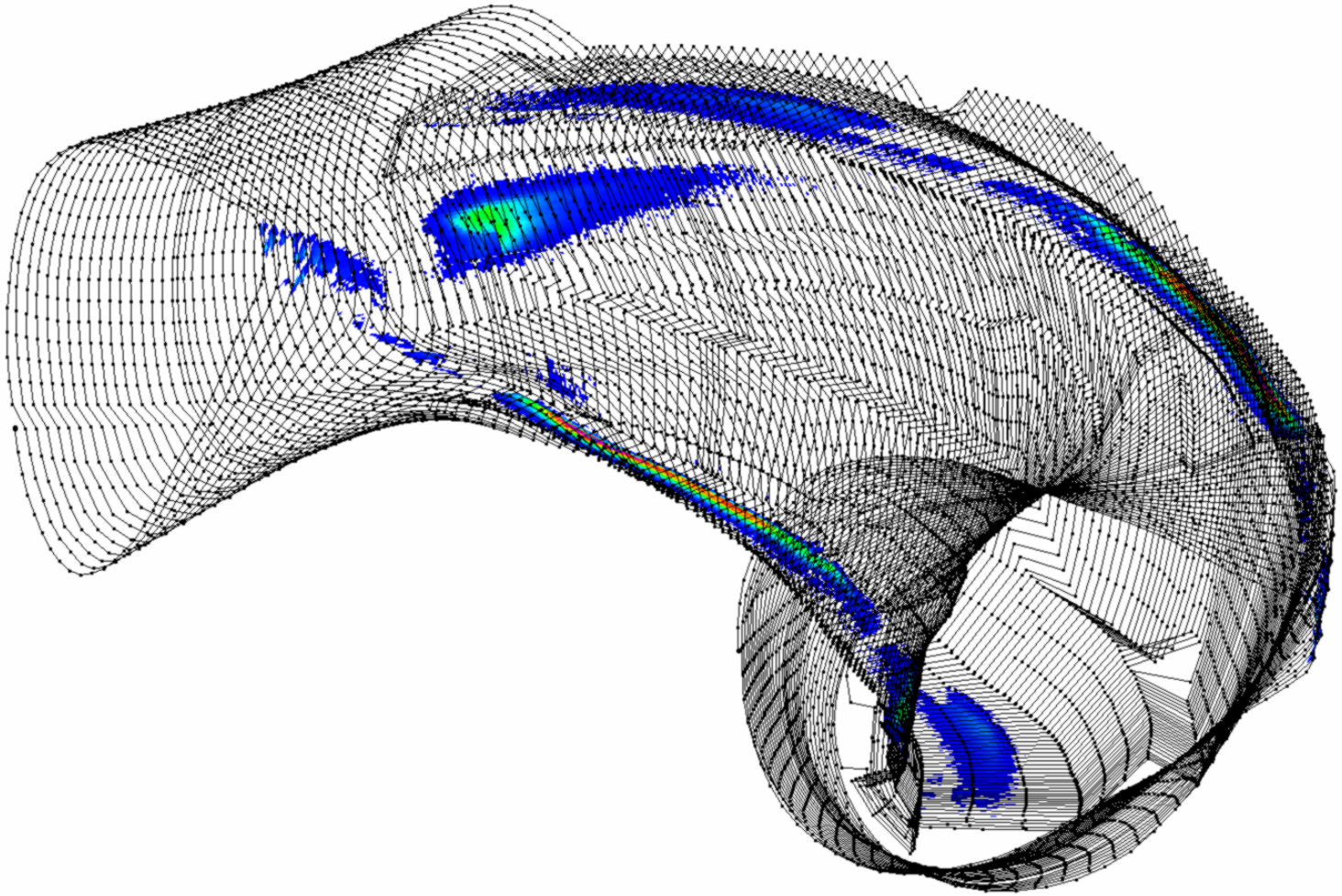
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_+01000.xdr

Originalgeometrie, High Iota, Beta = 0,8 %, Itor = -10 kA



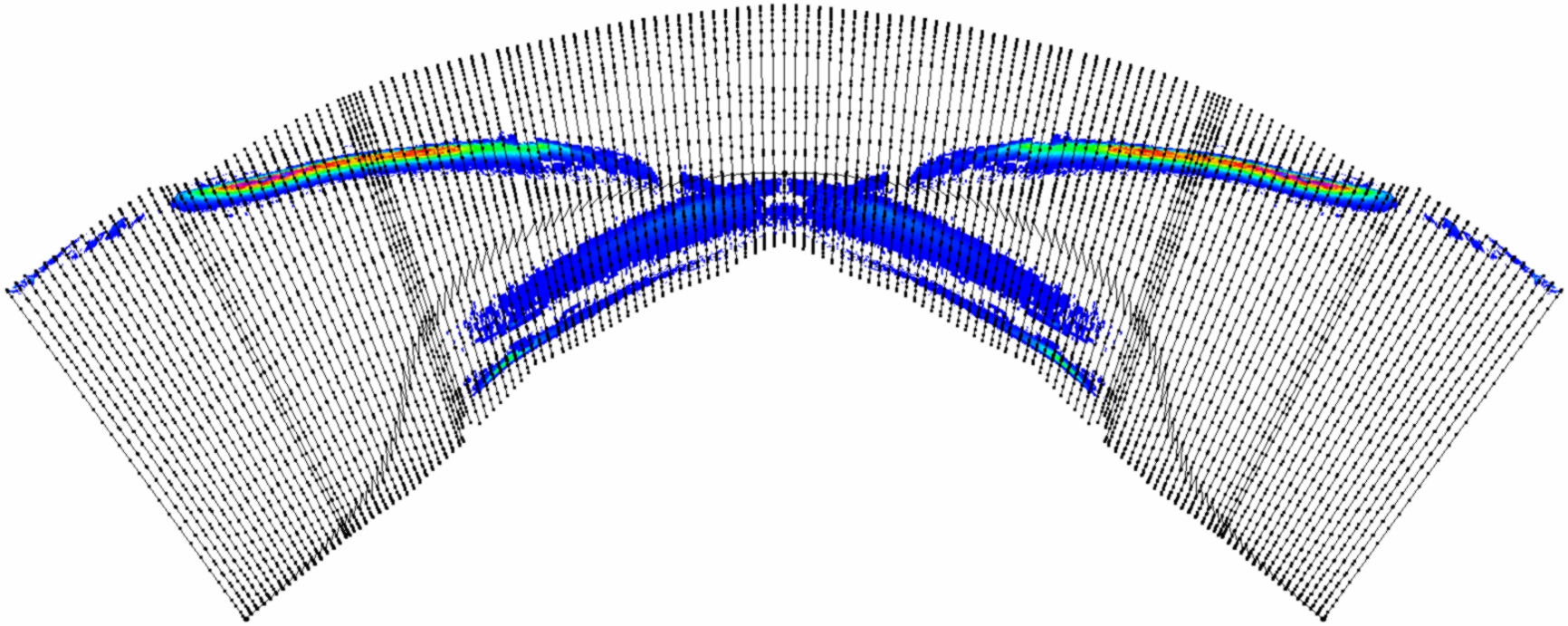
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.040_-01000.xdr

Originalgeometrie, High Iota, Beta = 0,8 %, Itor = -10 kA



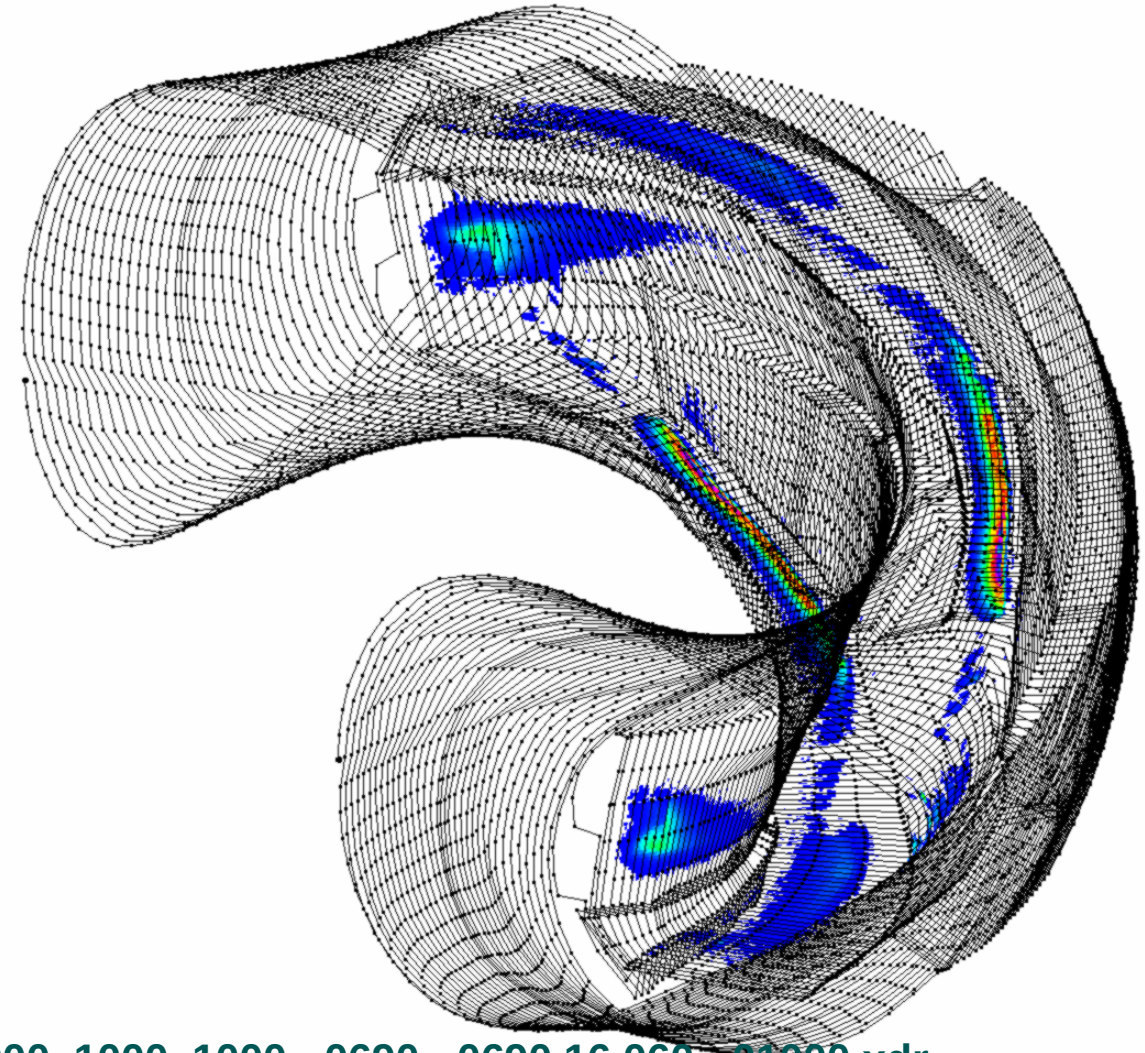
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.040_-01000.xdr

Originalgeometrie, High Iota, Beta = 0,8 %, Itor = -10 kA



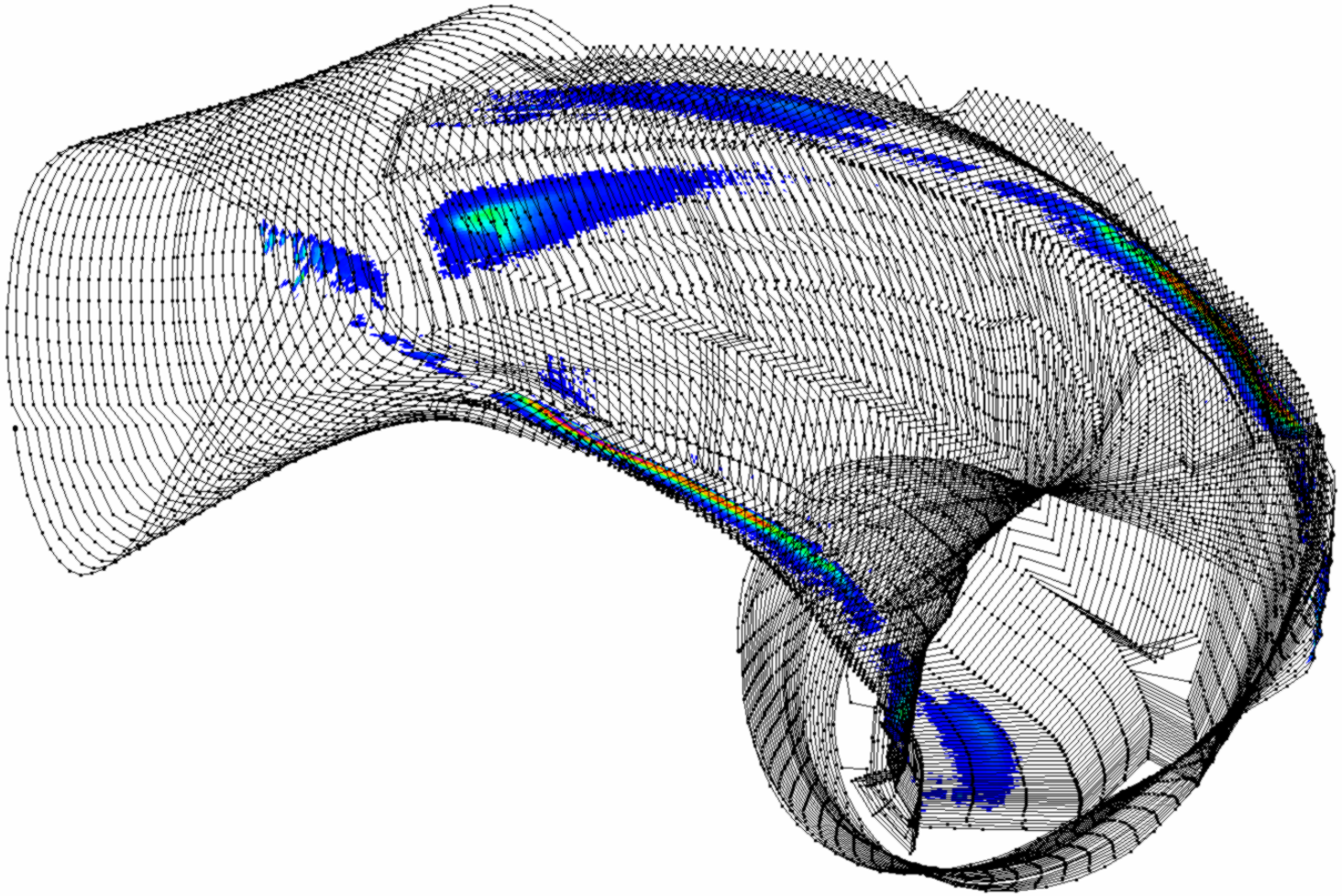
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.040_-01000.xdr

Originalgeometrie, High Iota, Beta = 1,2 %, Itor = -10 kA



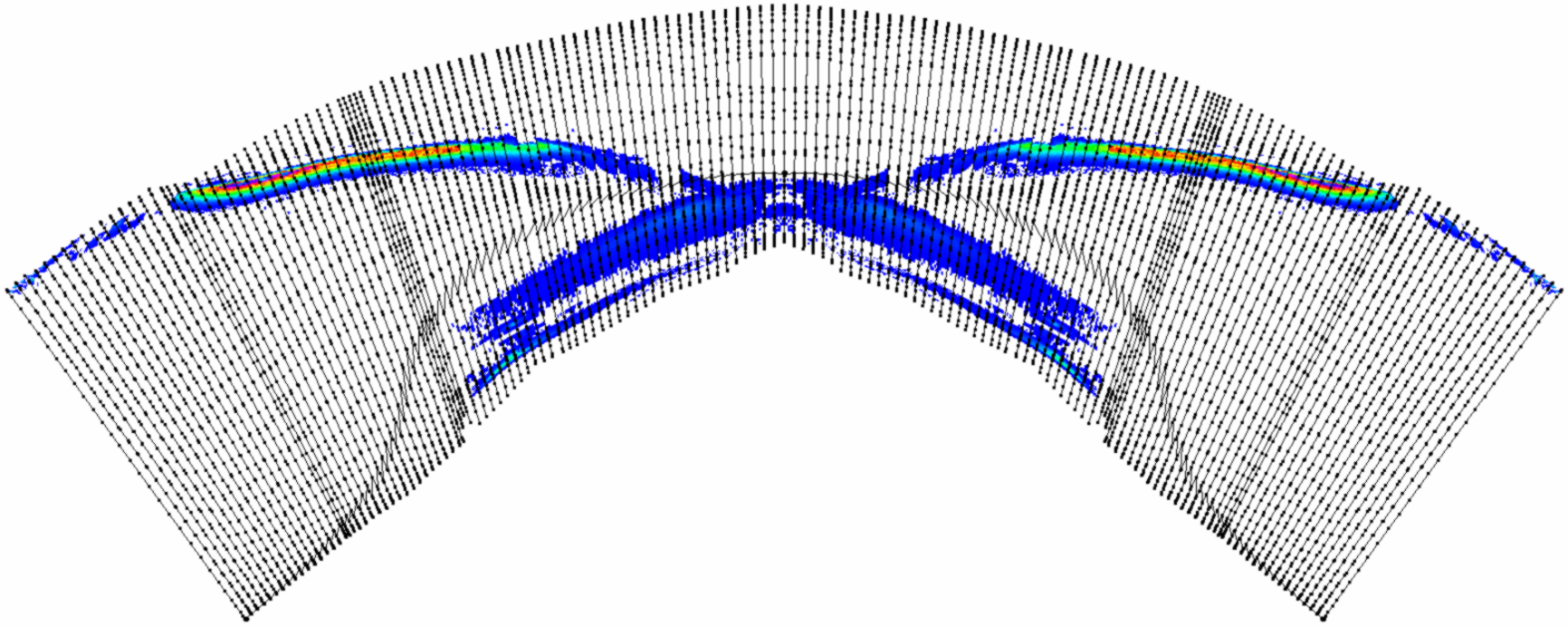
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_-01000.xdr

Originalgeometrie, High Iota, Beta = 1,2 %, Itor = -10 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_-01000.xdr

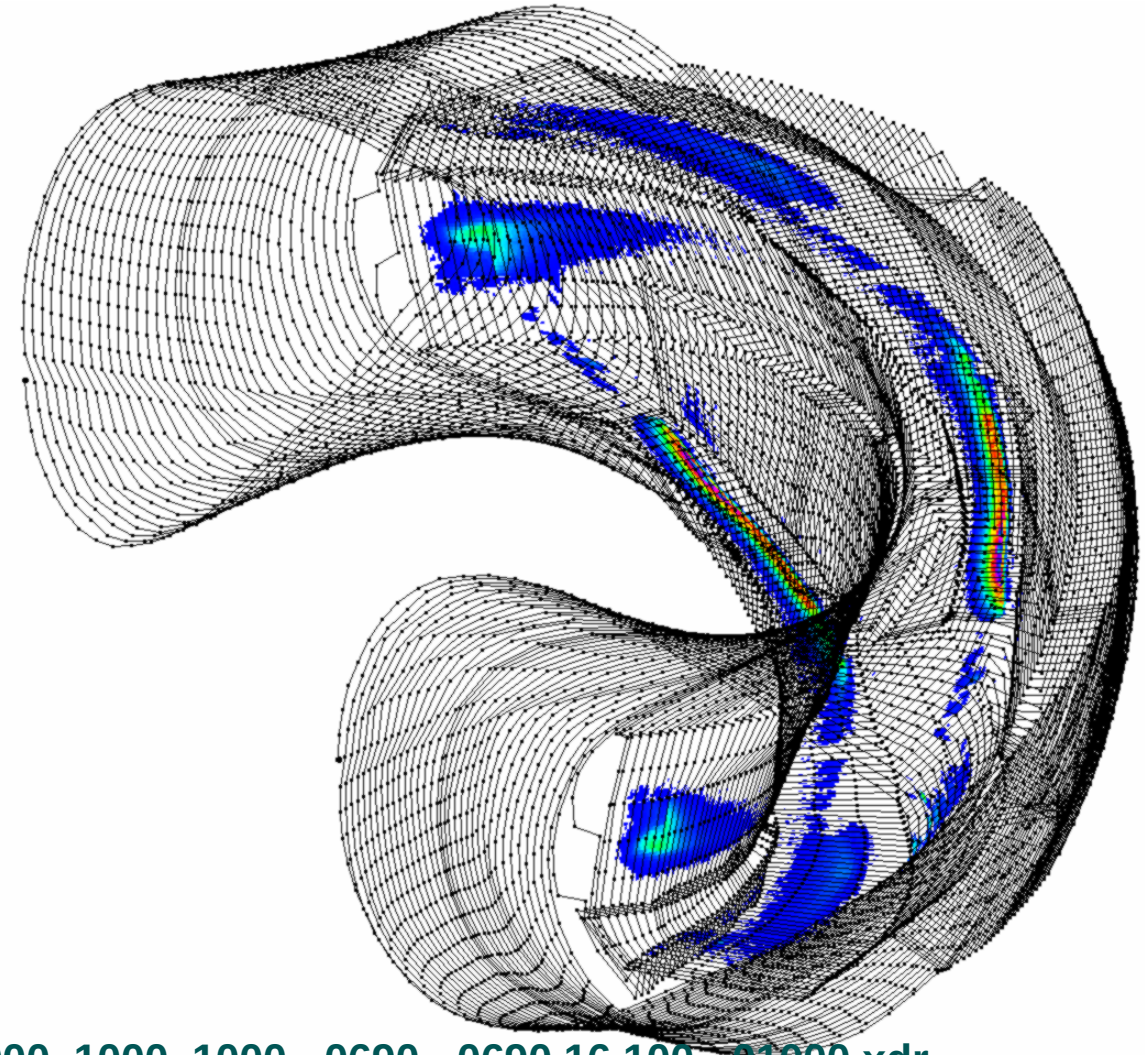
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = -10 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_-01000.xdr

Originalgeometrie, High Iota, Beta = 2,0 %, Itor = -10 kA

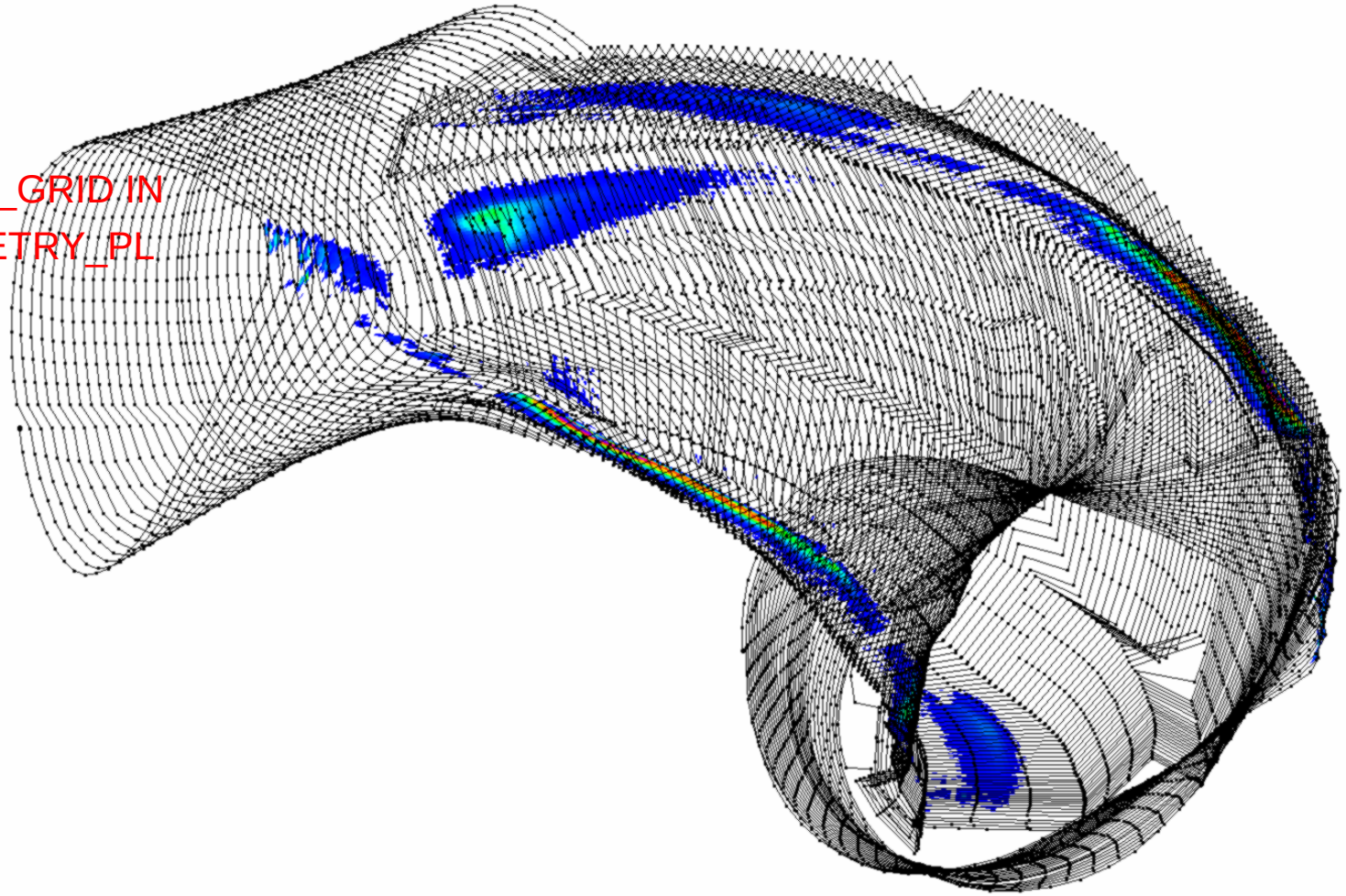
EMC3lite-Log:
ERROR IN READ_GRID IN
MODULE GEOMETRY_PL



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.100_-01000.xdr

Originalgeometrie, High Iota, Beta = 2,0 %, Itor = -10 kA

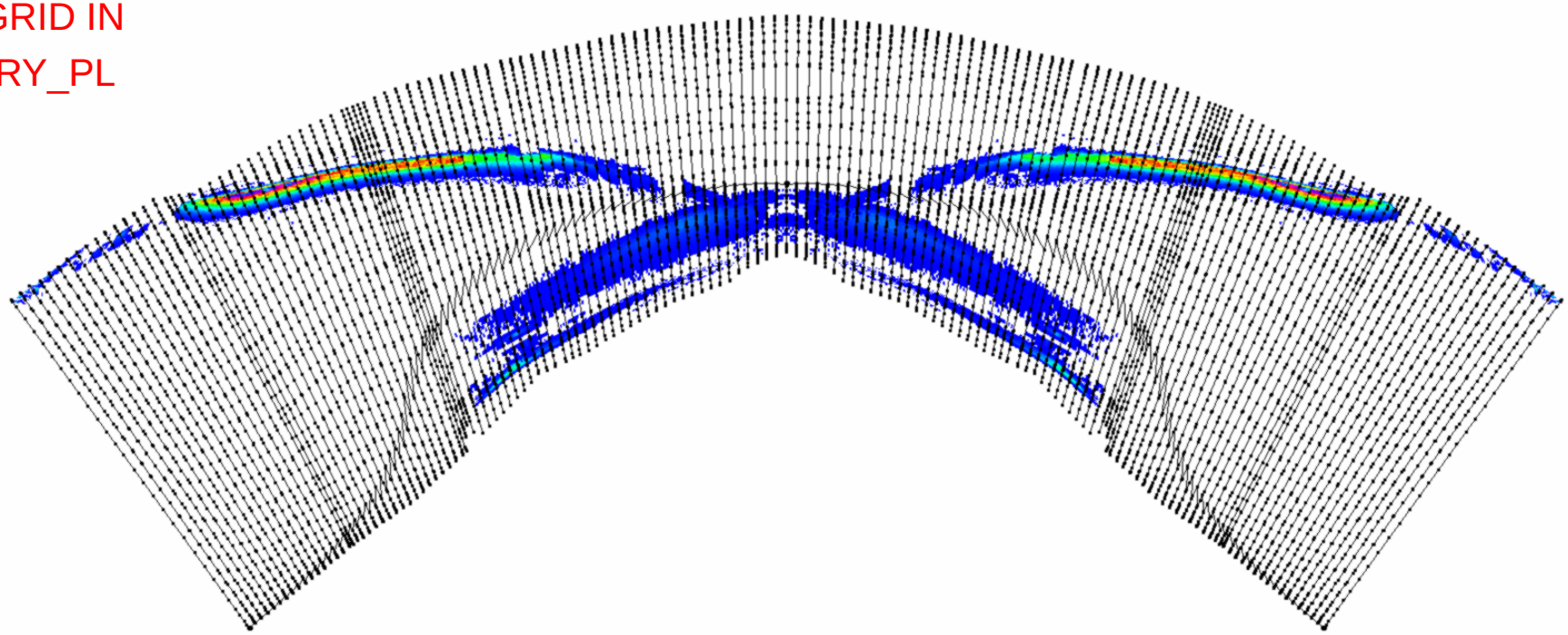
EMC3lite-Log:
ERROR IN READ_GRID IN
MODULE GEOMETRY_PL



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.100_-01000.xdr

Originalgeometrie, High Iota, Beta = 2,0 %, Itor = -10 kA

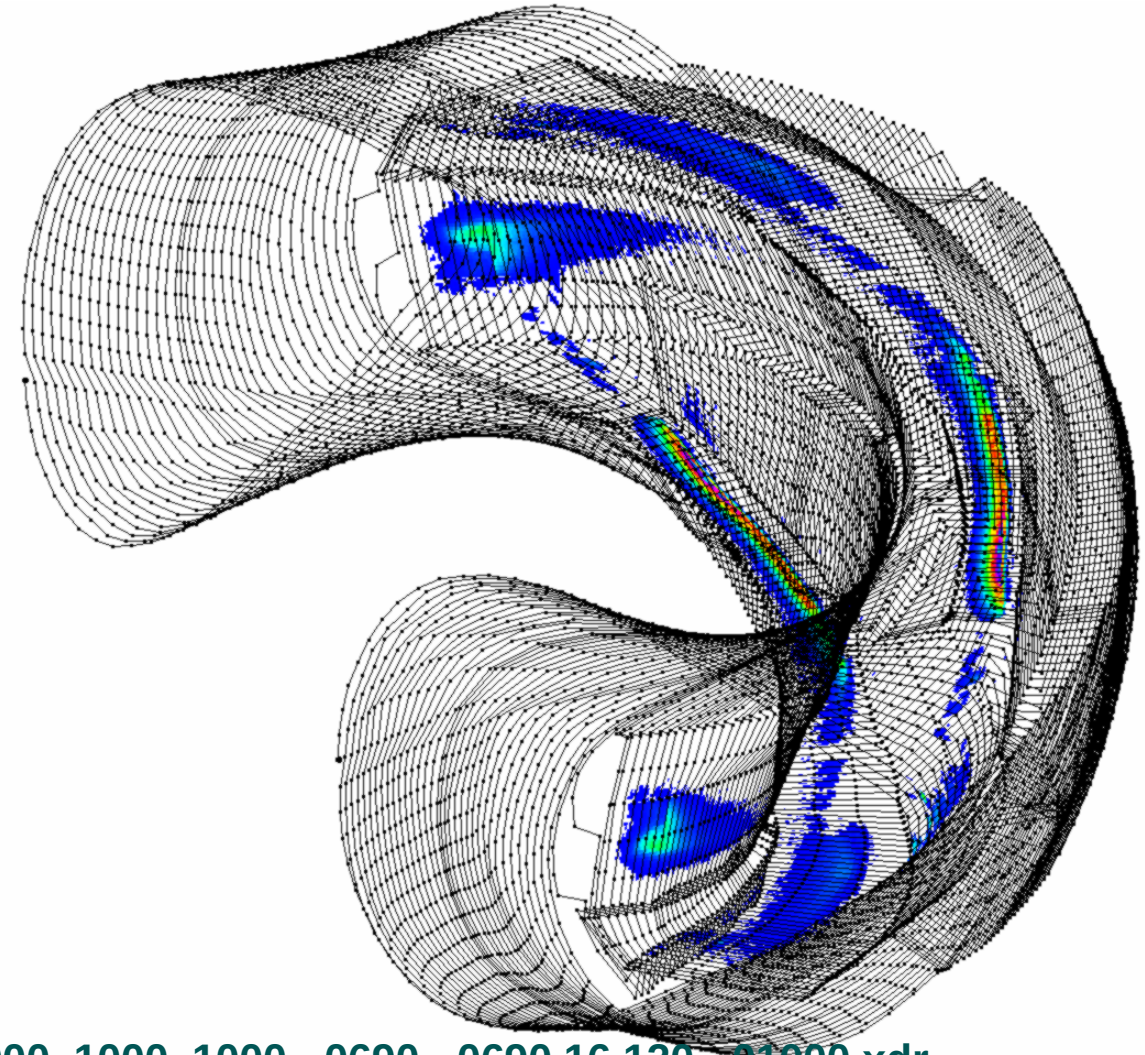
EMC3lite-Log:
ERROR IN READ_GRID IN
MODULE GEOMETRY_PL



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.100_-01000.xdr

Originalgeometrie, High Iota, Beta = 2,4 %, Itor = -10 kA

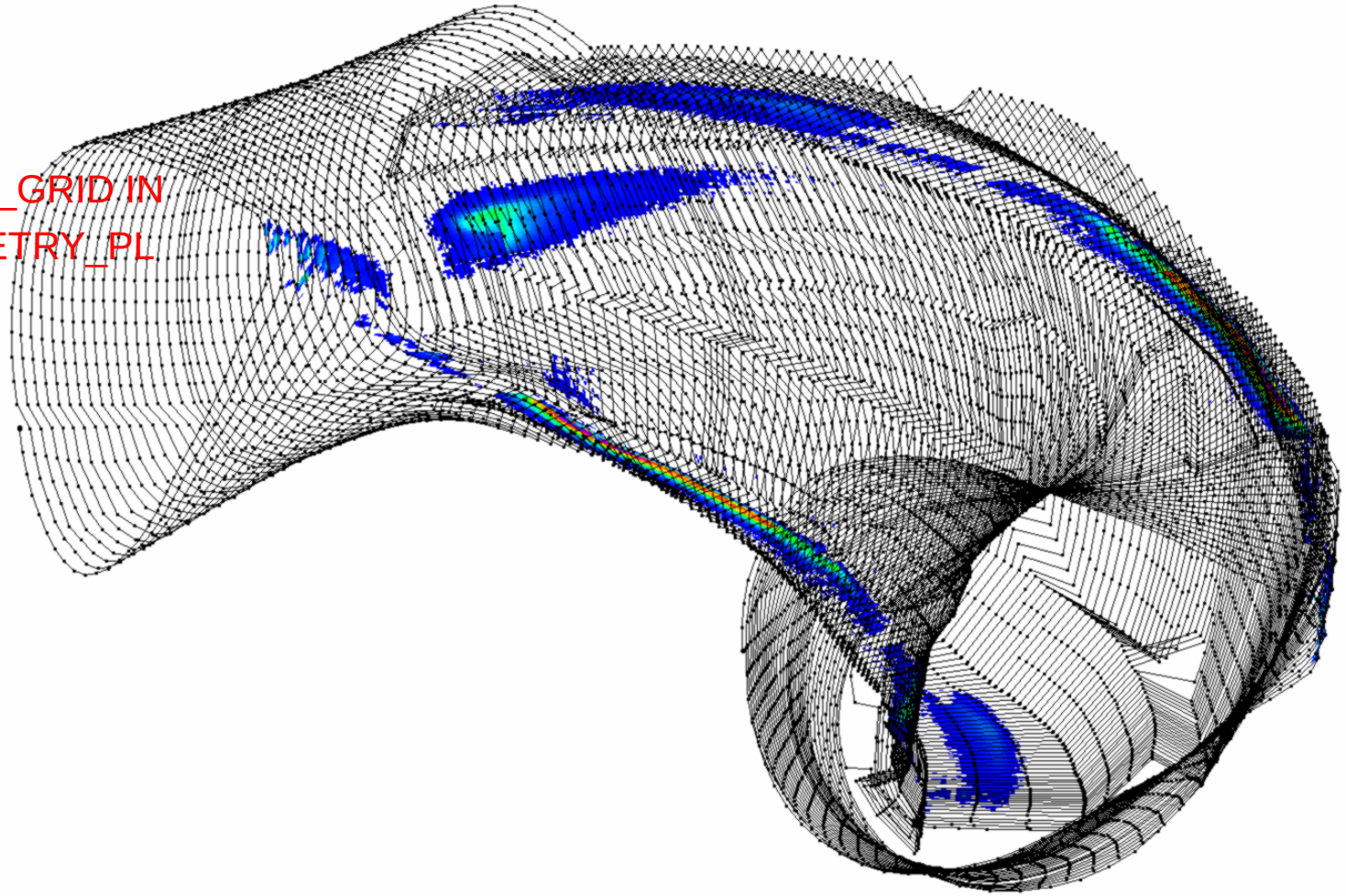
EMC3lite-Log:
ERROR IN READ_GRID IN
MODULE GEOMETRY_PL



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_-01000.xdr

Originalgeometrie, High Iota, Beta = 2,4 %, Itor = -10 kA

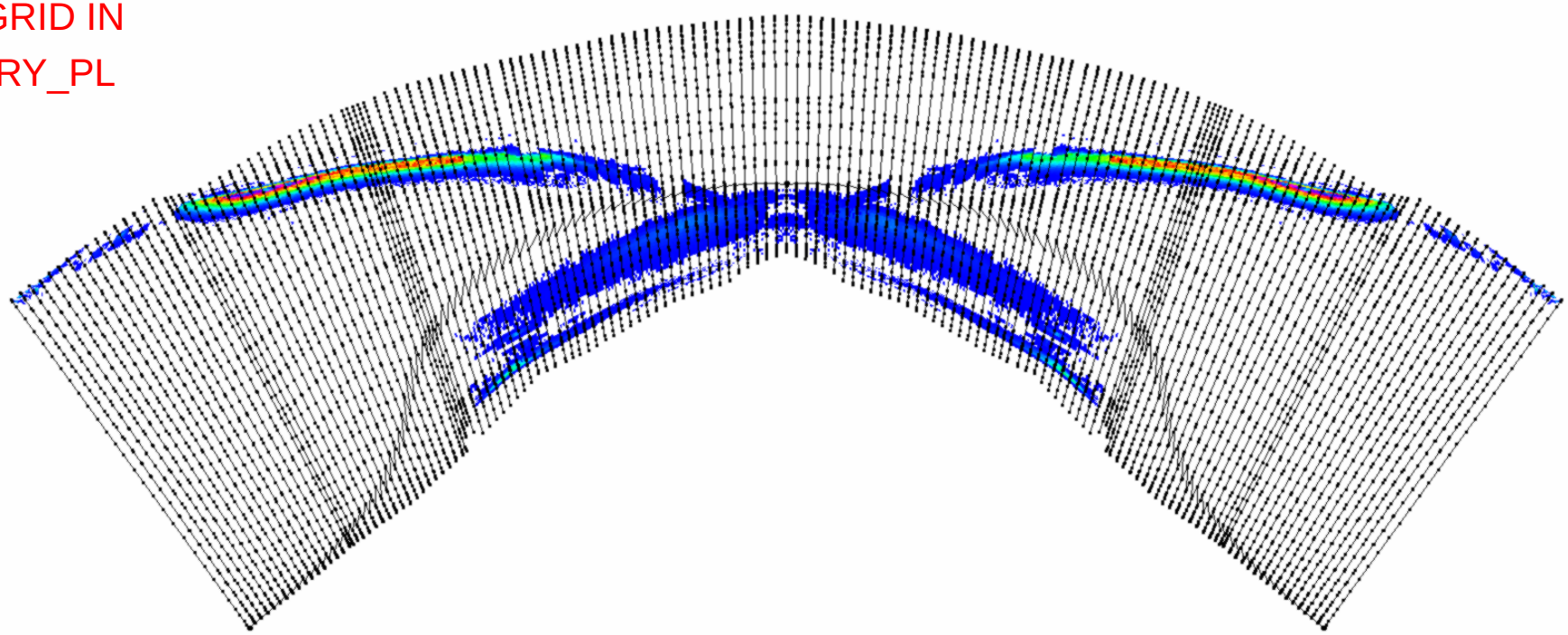
EMC3lite-Log:
ERROR IN READ_GRID IN
MODULE GEOMETRY_PL



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_-01000.xdr

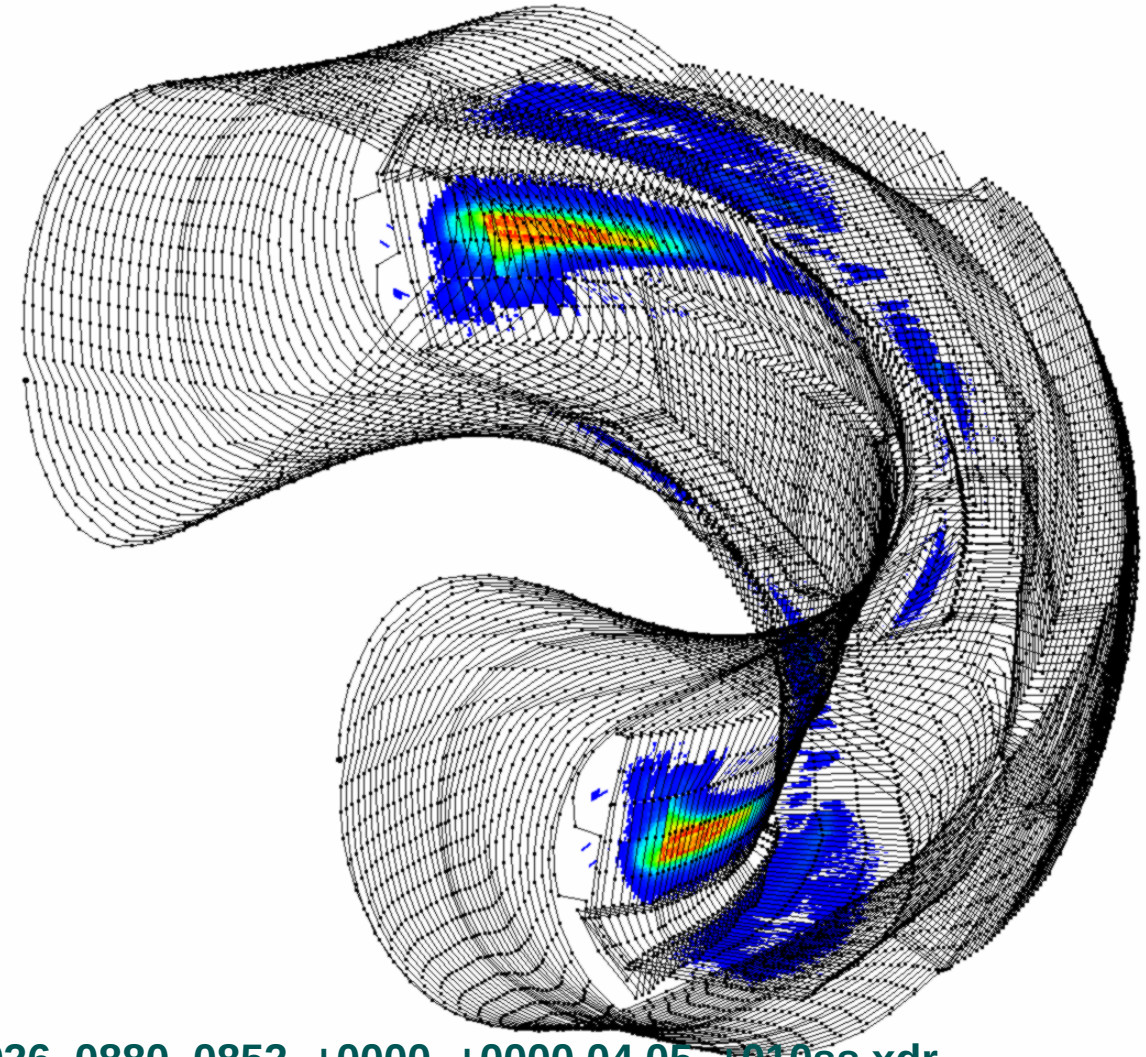
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = -10 kA

EMC3lite-Log:
ERROR IN READ_GRID IN
MODULE GEOMETRY_PL



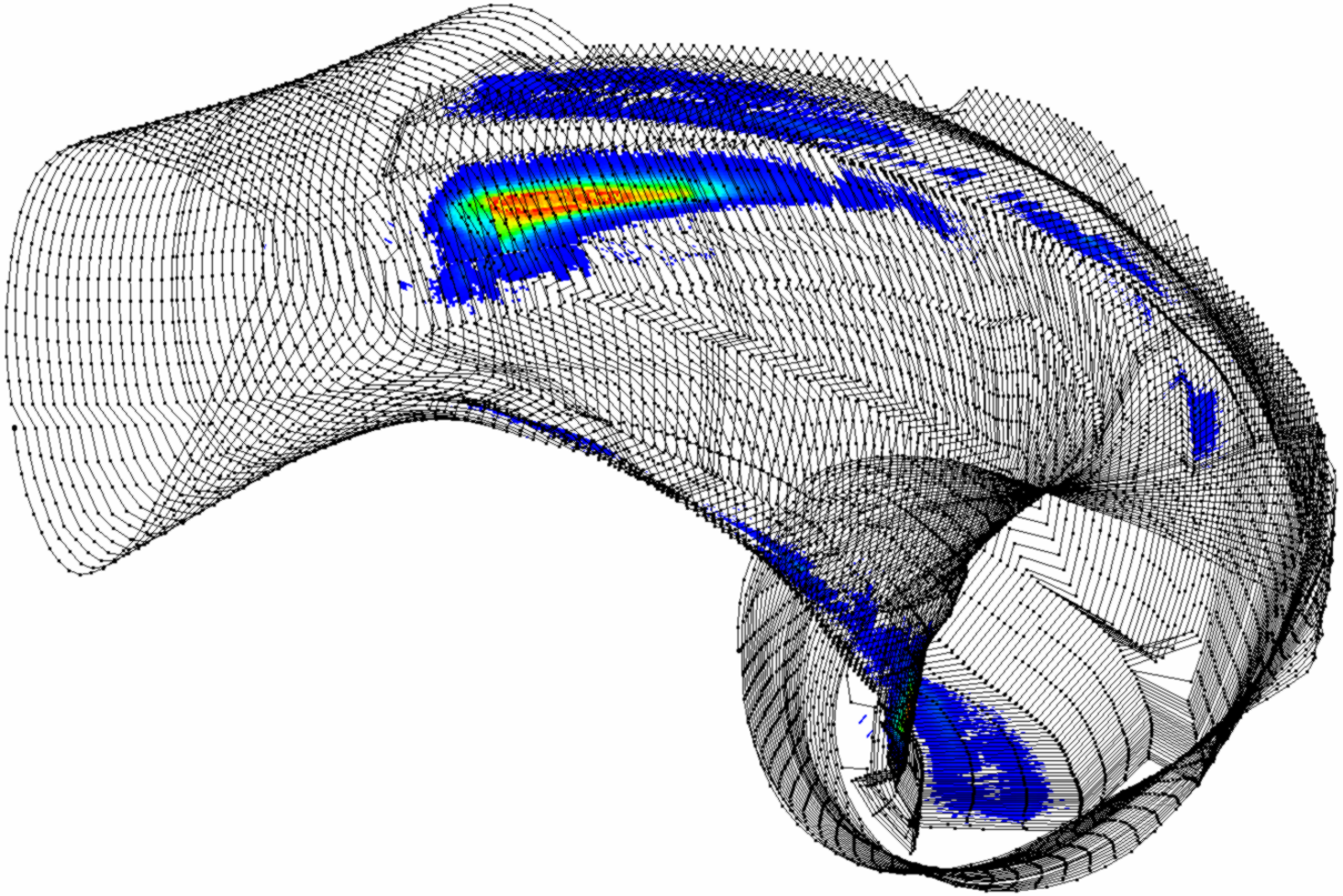
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_-01000.xdr

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = 10 kA



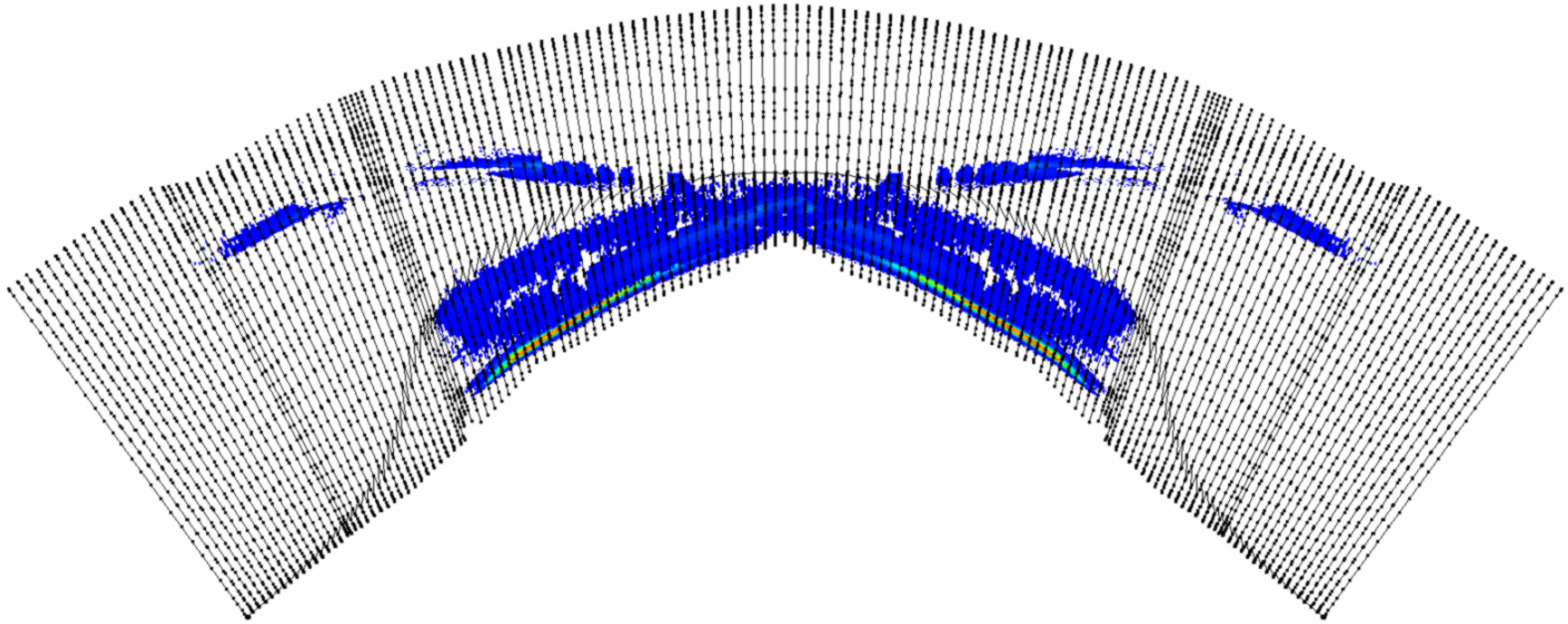
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.05_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = 10 kA



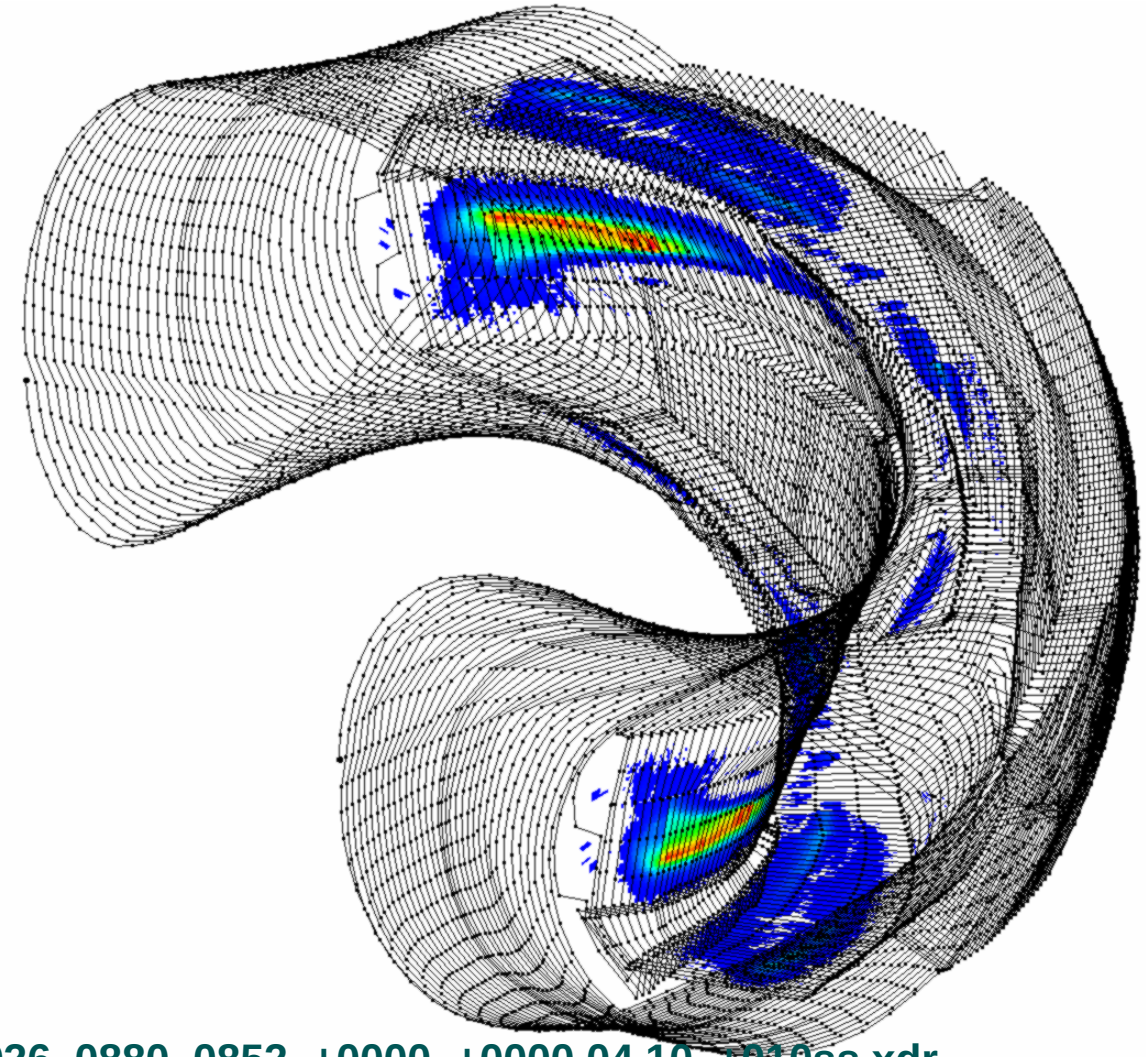
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.05_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = 10 kA



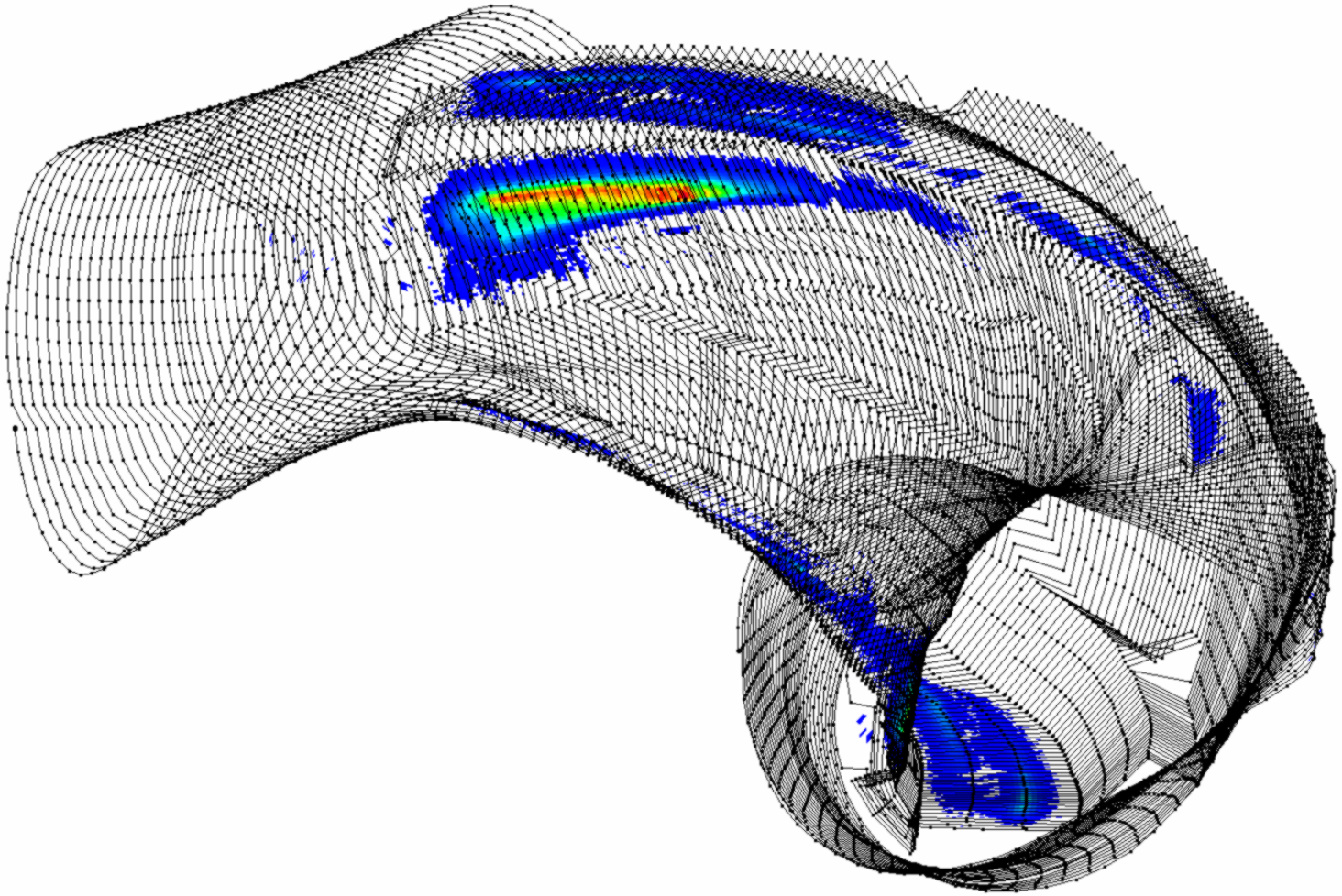
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.05_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = 10 kA



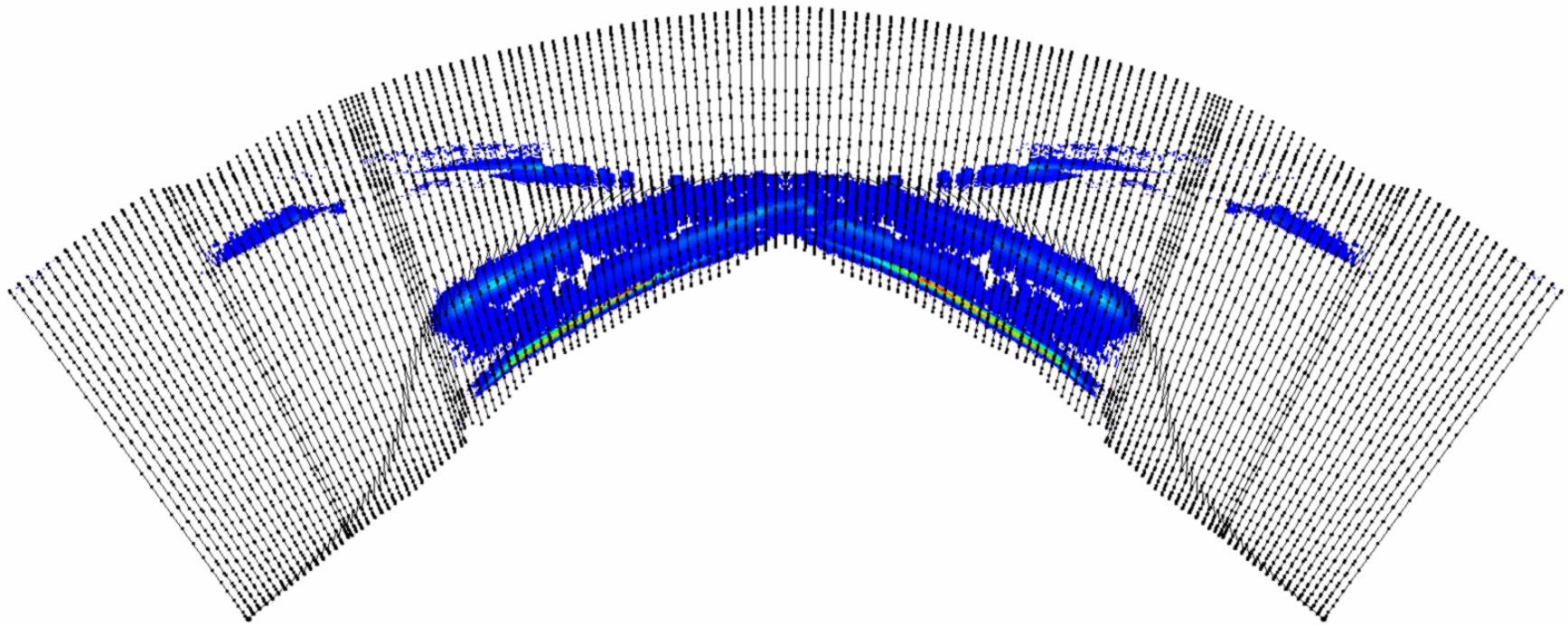
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.10_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = 10 kA



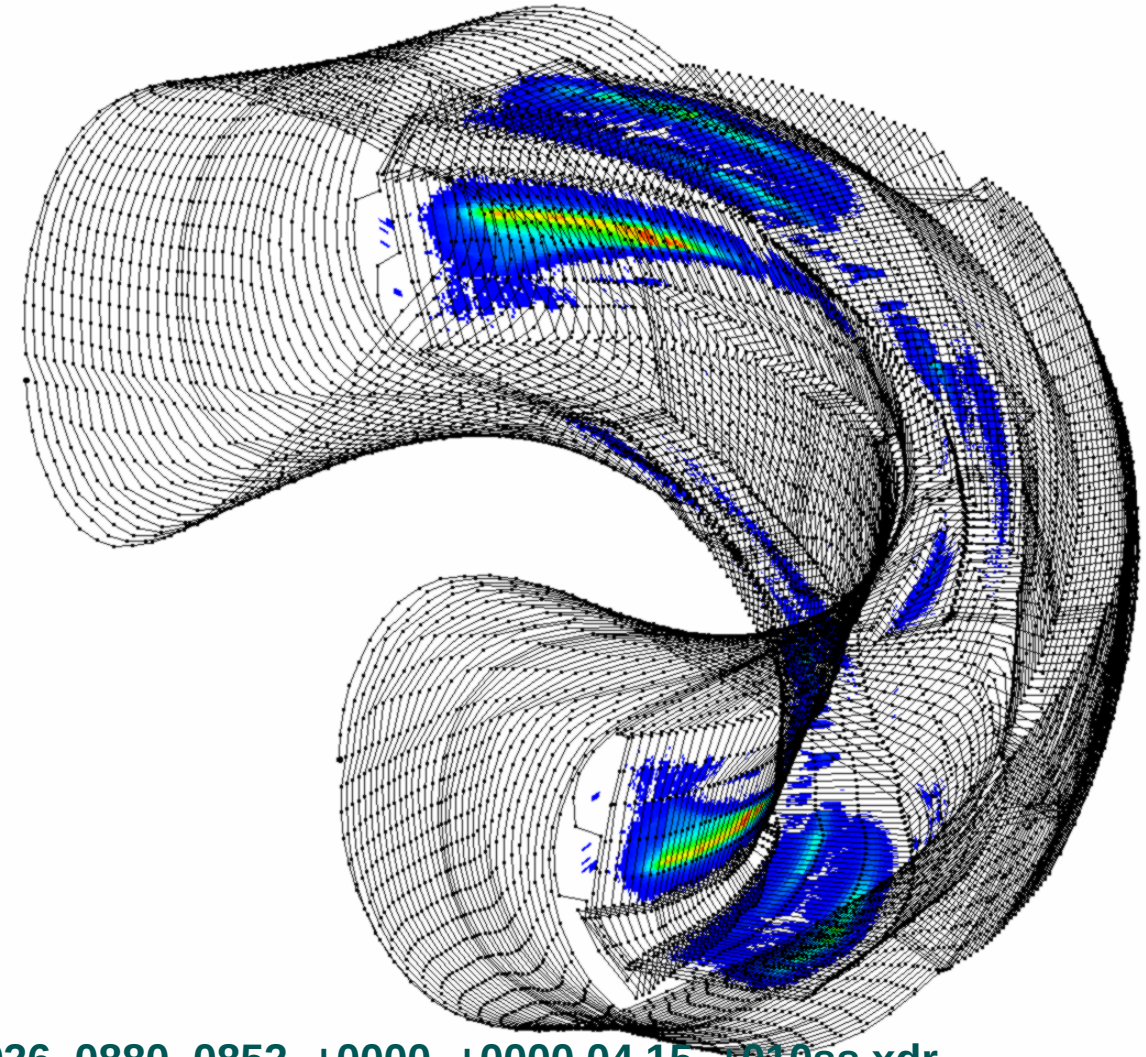
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.10_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = 10 kA



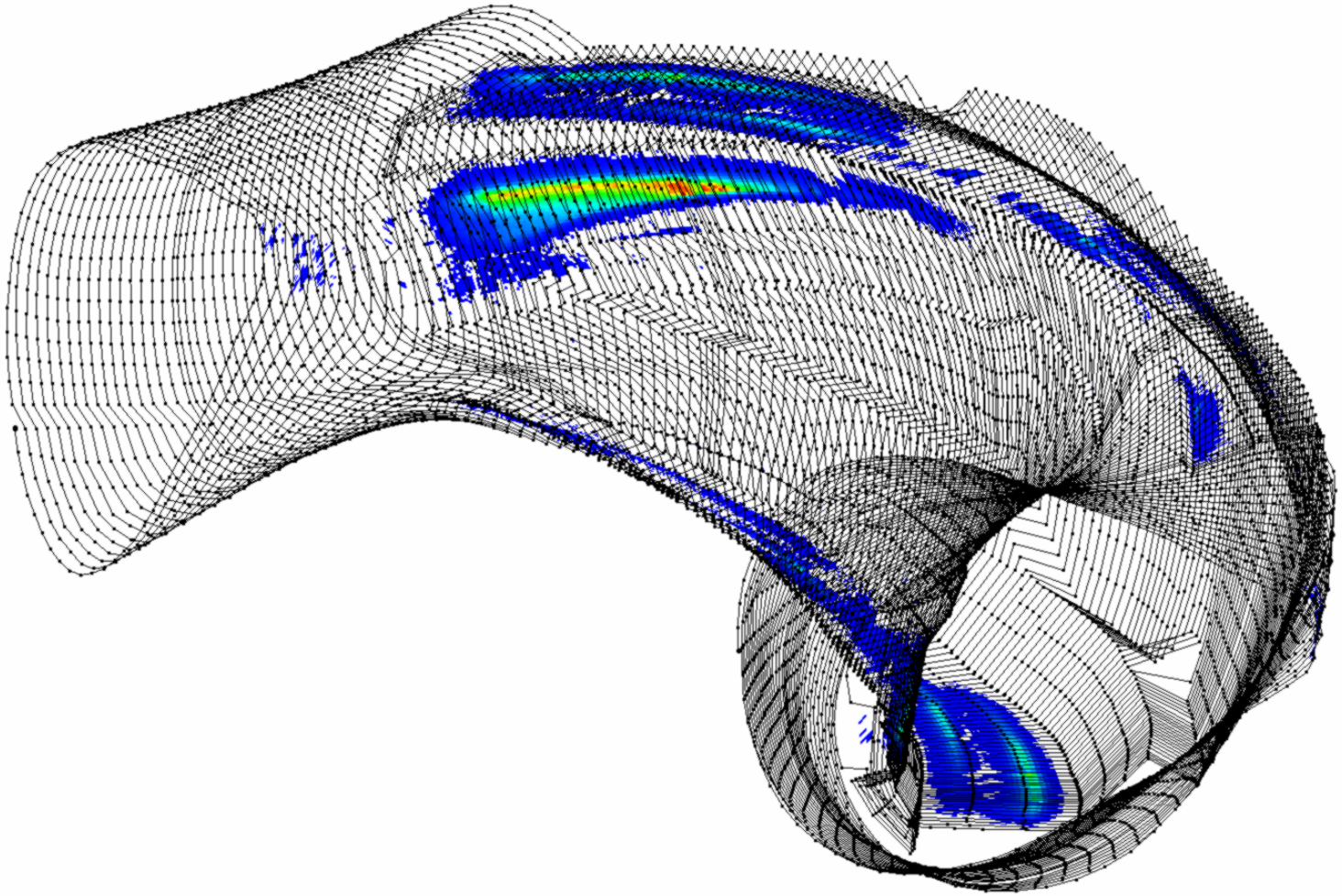
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.10_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 10 kA



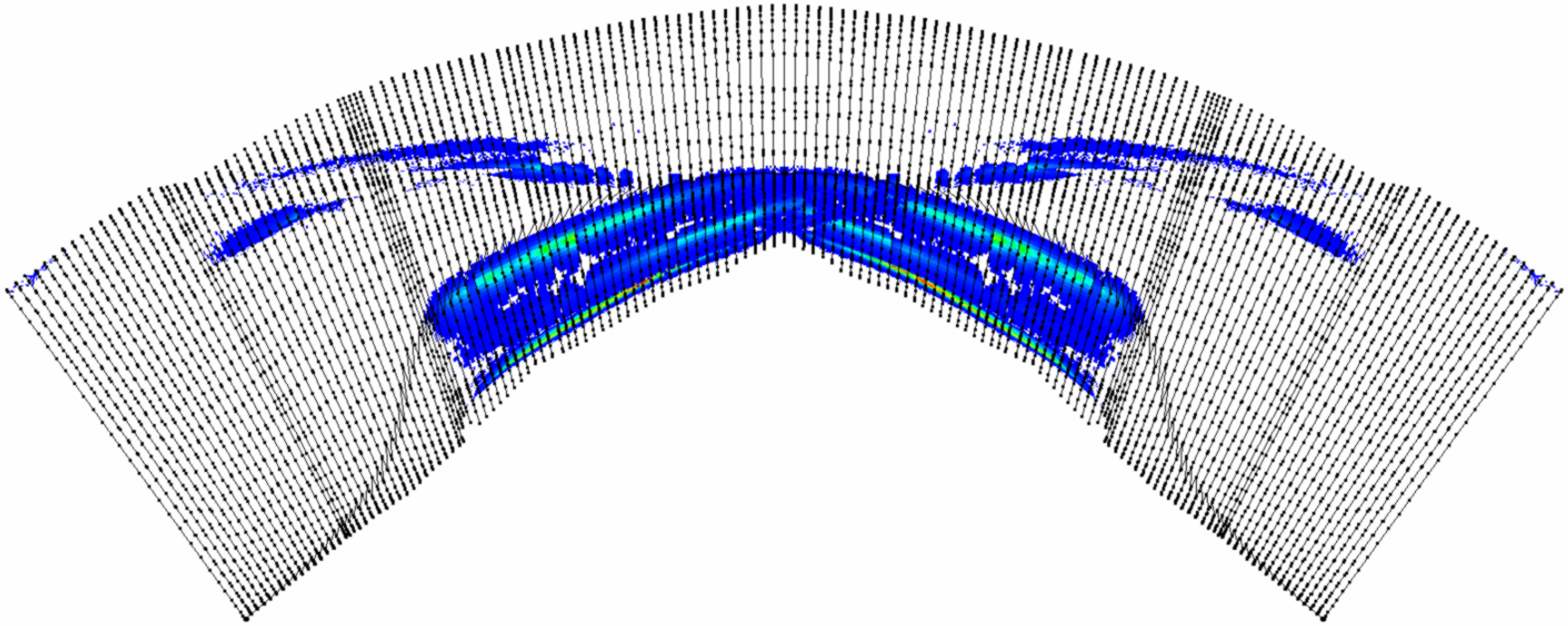
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 10 kA



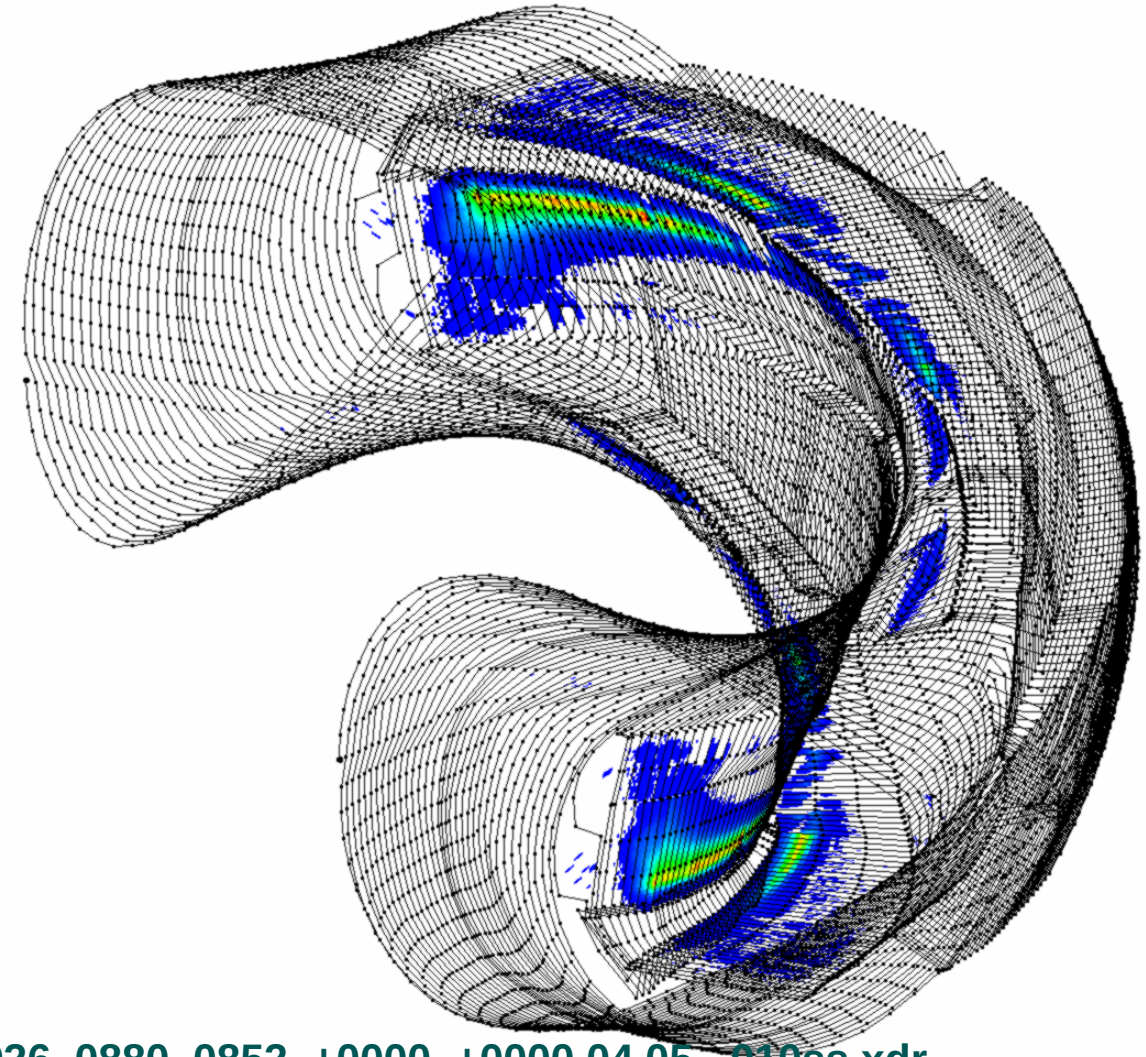
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 10 kA



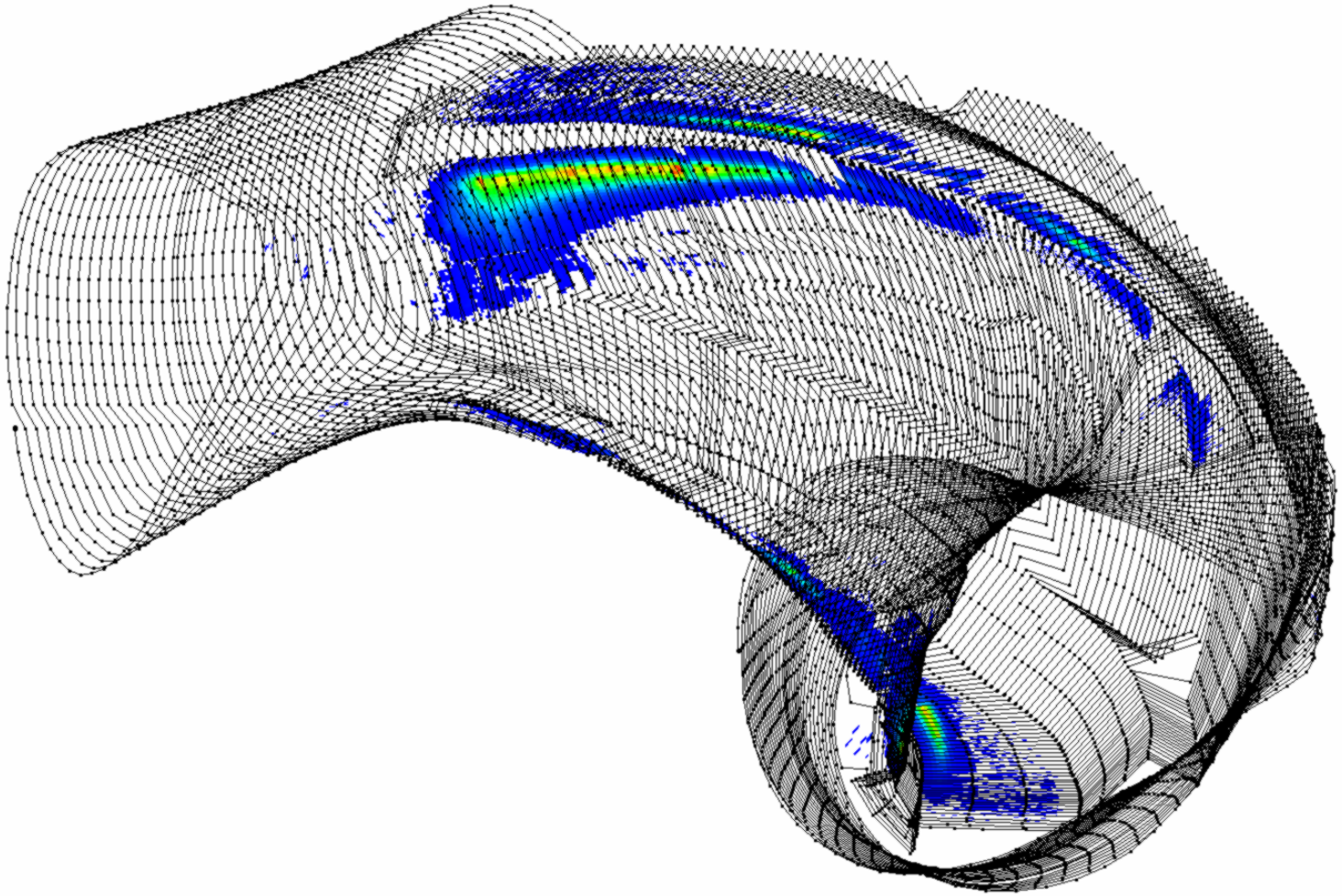
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15_+010ss.xdr

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = -10 kA



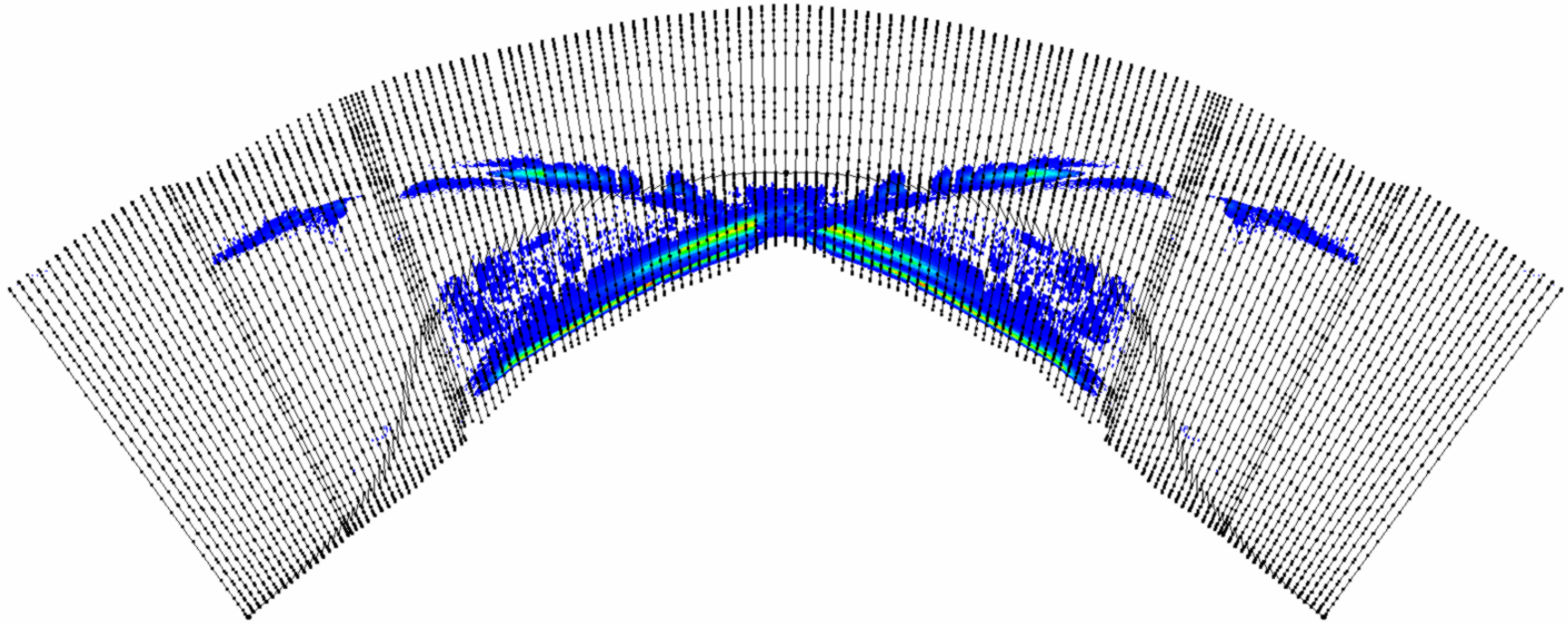
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.05_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = -10 kA



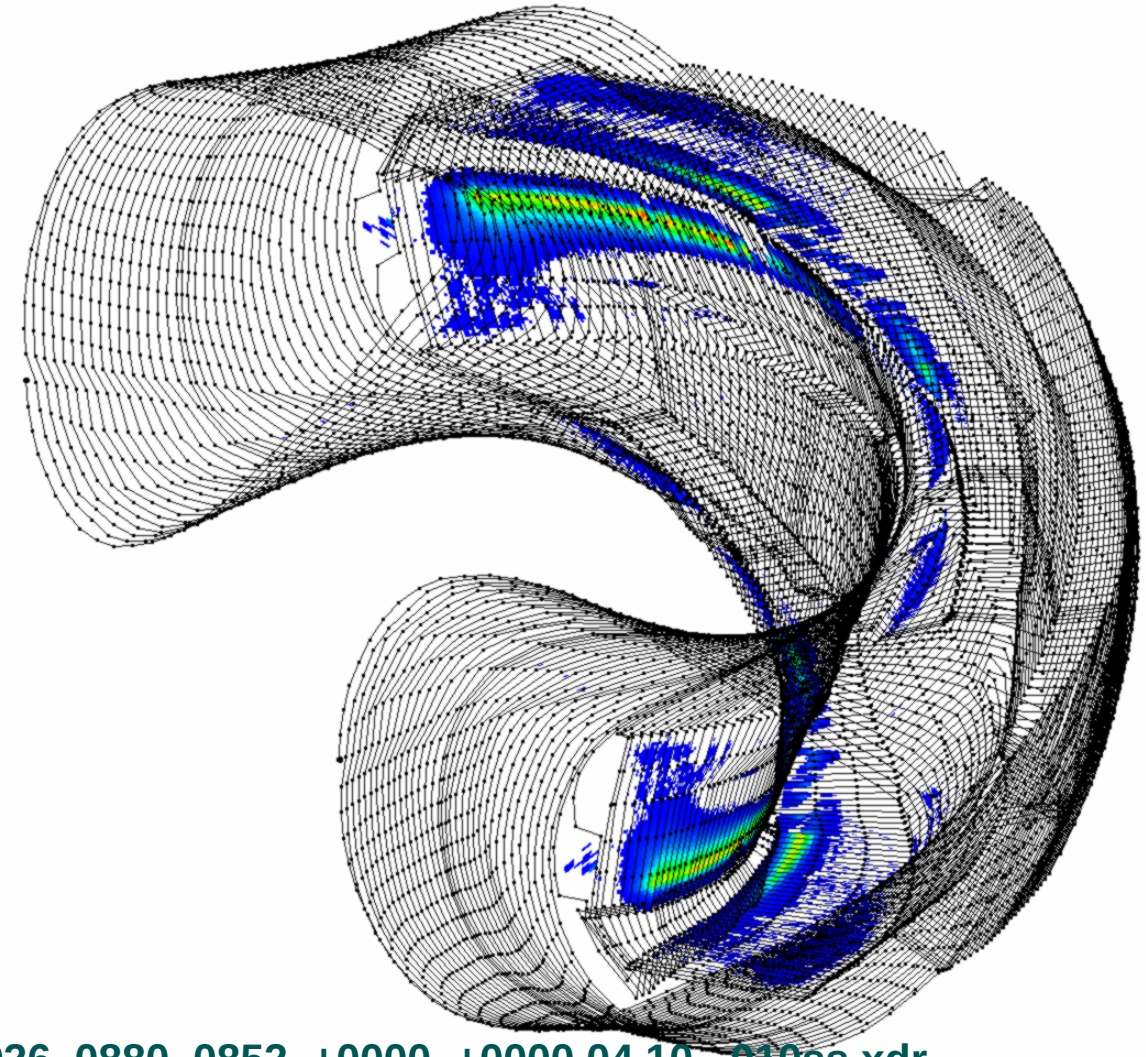
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.05_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 1,0 %, Itor = -10 kA



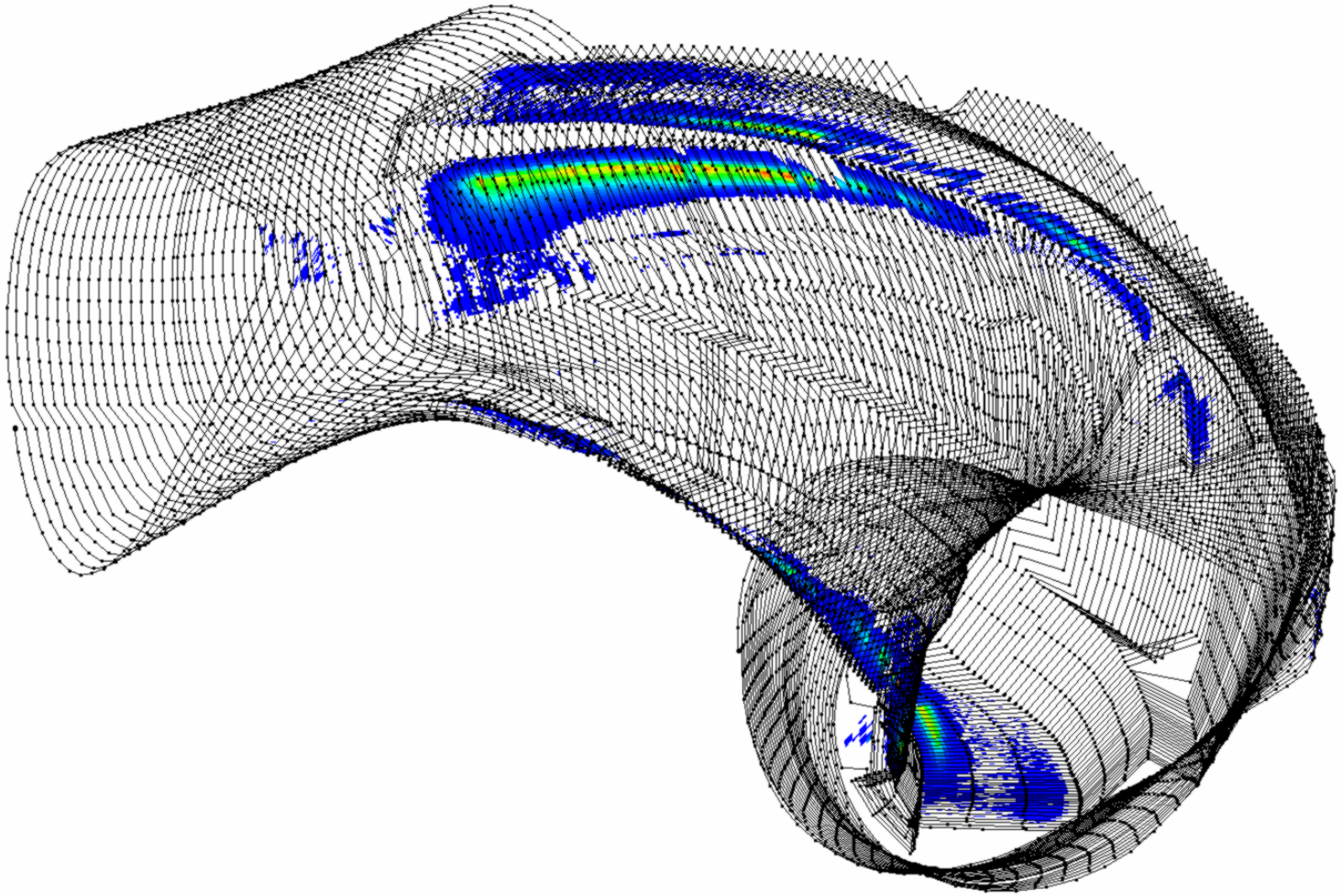
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.05_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = -10 kA



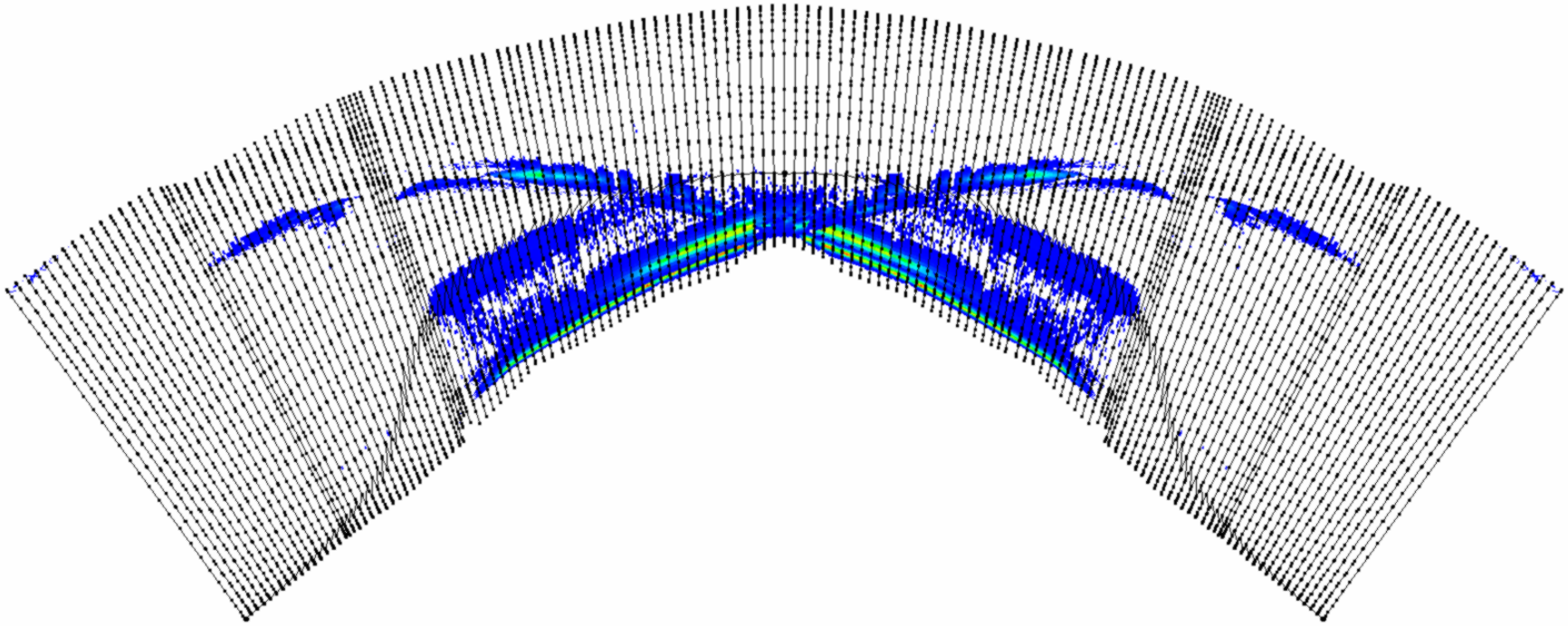
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.10_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = -10 kA



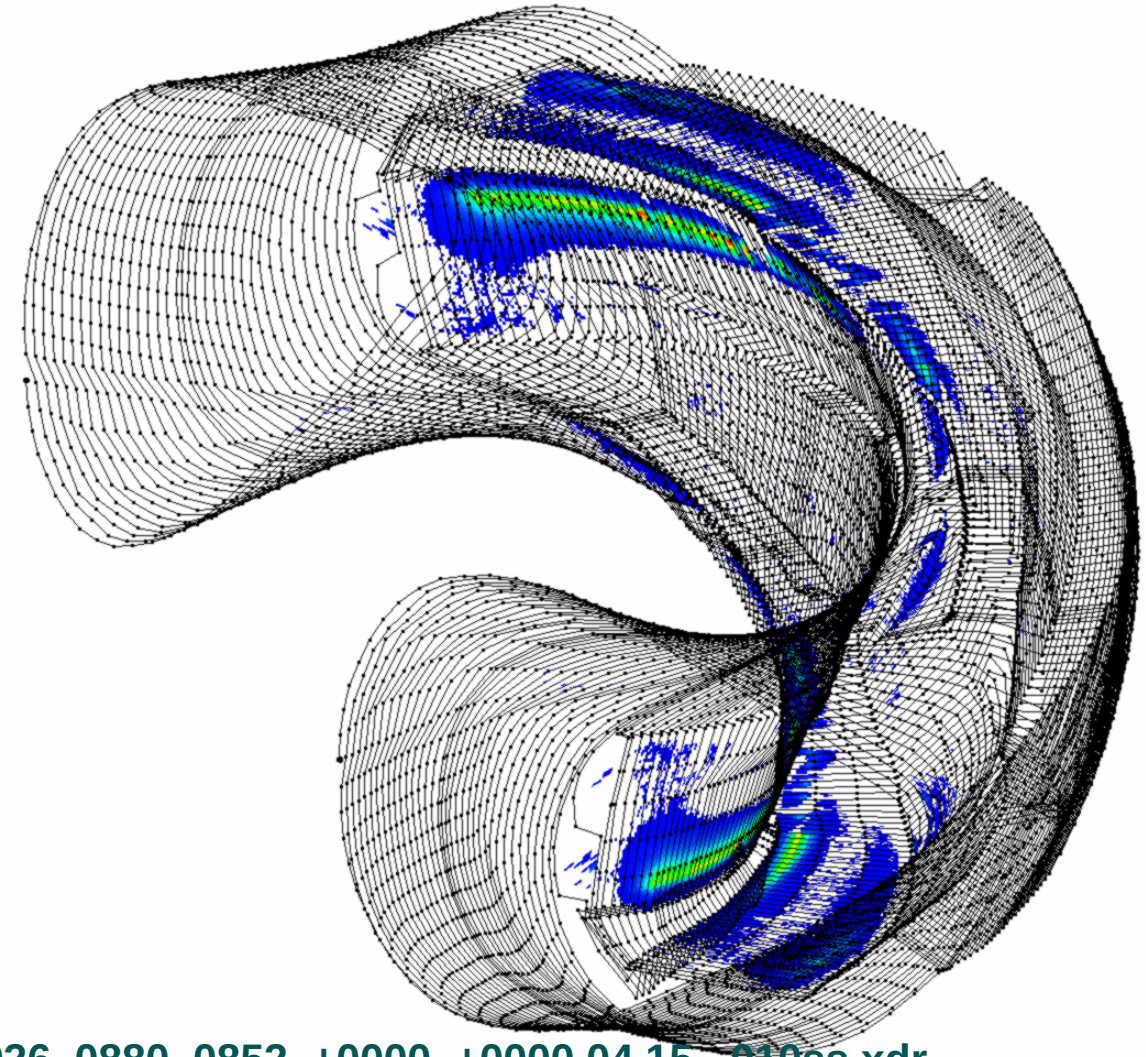
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.10_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = -10 kA



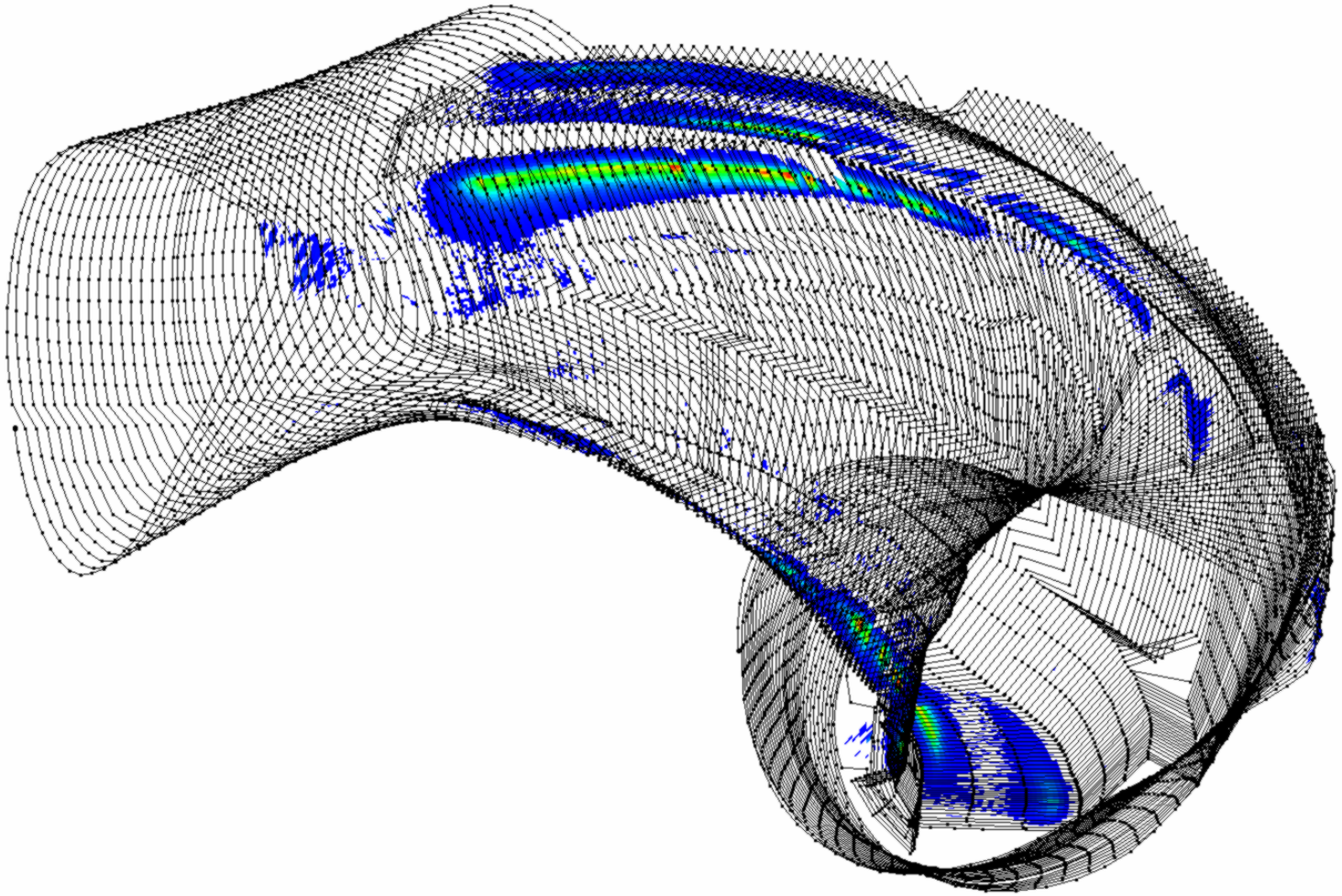
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.10_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = -10 kA



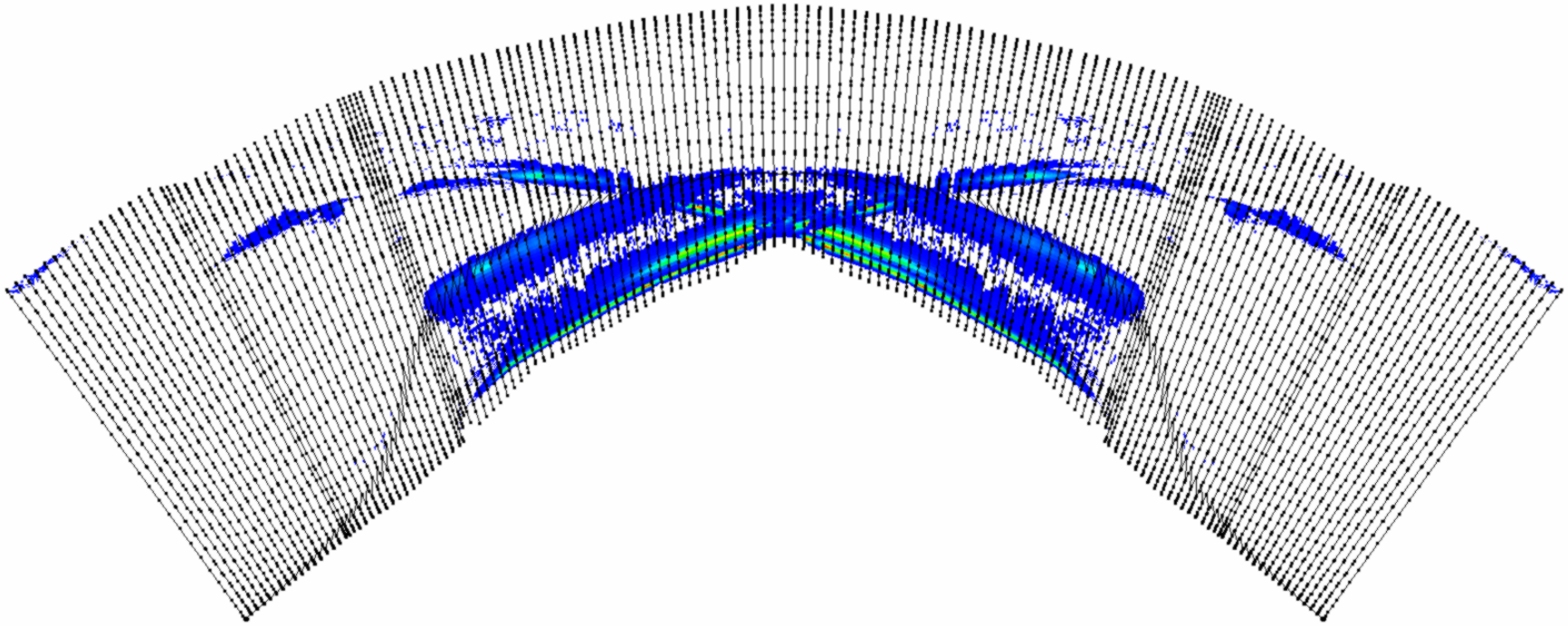
fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = -10 kA



fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15_-010ss.xdr

Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = -10 kA



fieldn_altern181x181x96.w7x.0972_0926_0880_0852_+0000_+0000.04.15_-010ss.xdr

Changes in heat load pattern with Itor ≈ ±20 kA and varied beta

Standard, Itor = 20/24 kA: with increasing beta, the heat load on TMv decreases and the load on TMh increases. For beta > 2% a second strike line on the outside of TMh appears.

Standard, Itor = -20/-24 kA: with increasing beta, the heat load on TMv increases slightly, otherwise almost no changes. With higher beta the strike line approaches the pumping gap.

The behaviour for both pos. and neg. Itor is very similar to the behaviour at Itor ≈ ± 10 kA.

High Iota, Itor = 20 kA: with increasing beta, the strike line gets almost unnoticeable narrower.

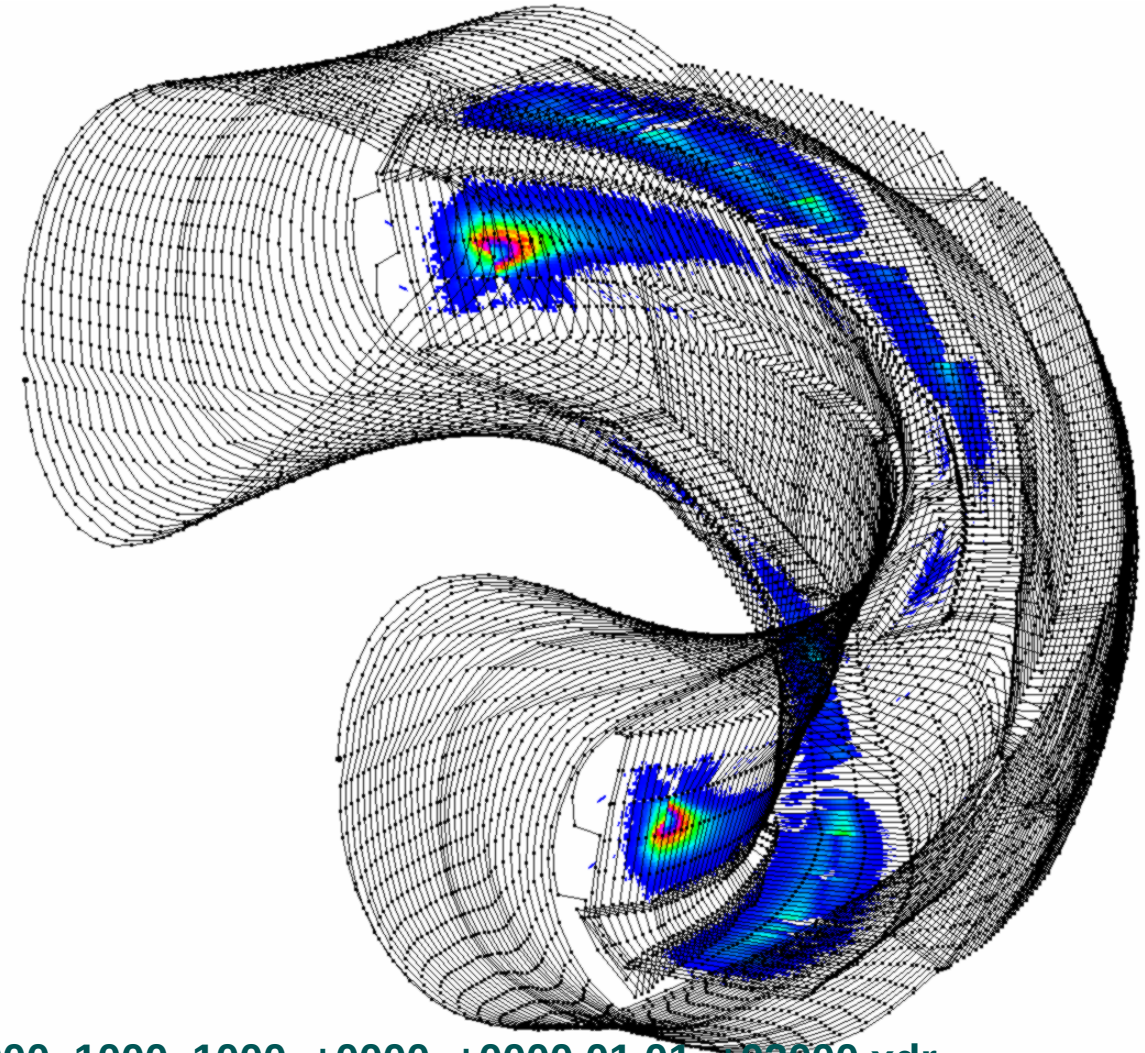
High Iota, Itor = -20 kA: with increasing beta, the heat load patch on TMv decreases and the strike line becomes slightly larger (first longer, then thicker).

High Mirror: Very similar to Standard

High Mirror, Itor = 20 kA: with increasing beta, the heat load on TMv gradually decreases and the load on TMh increases.

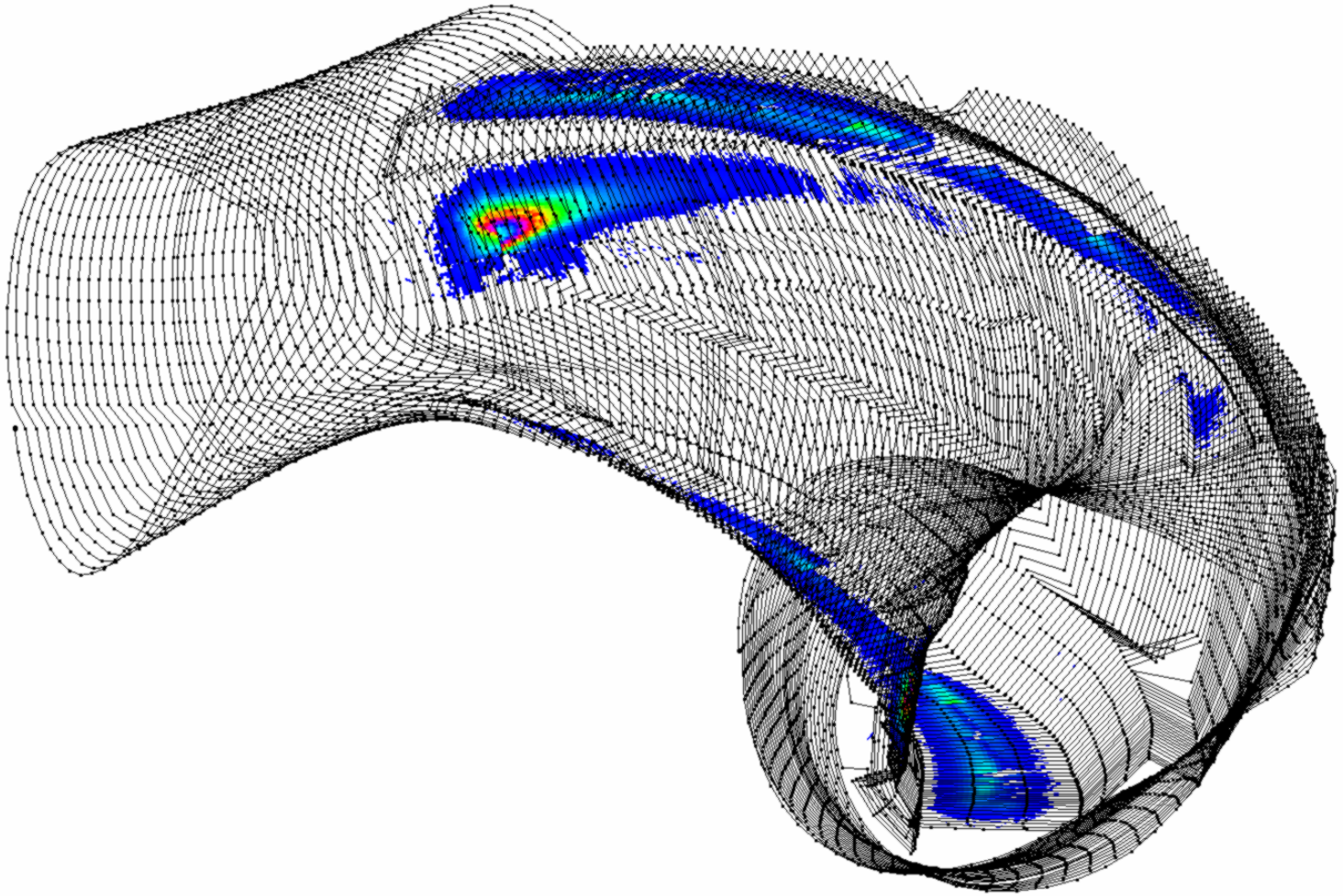
High Mirror, Itor = -20 kA: with increasing beta, the heat load on TMv decreases slightly and the loaded area on TMh increases.

Originalgeometrie, Standard, Beta = 0,16 %, Itor = 20 kA



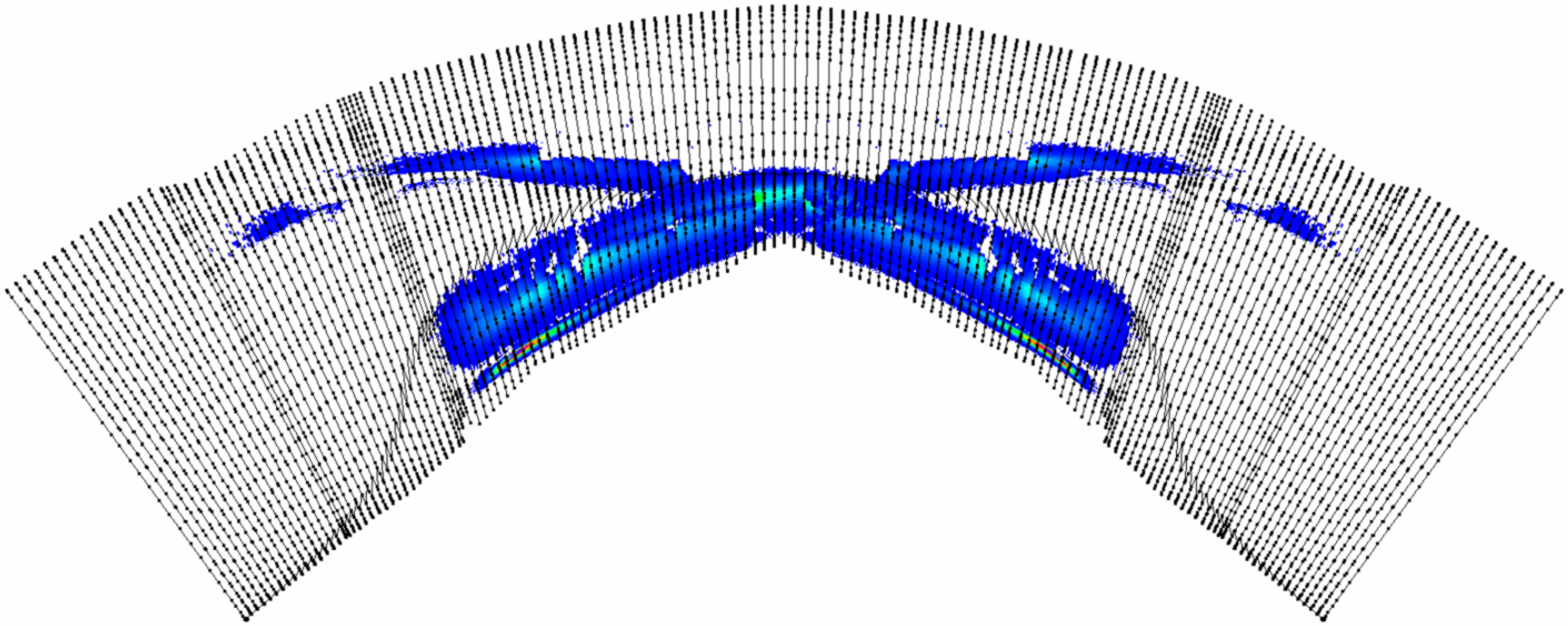
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_+02000.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = 20 kA



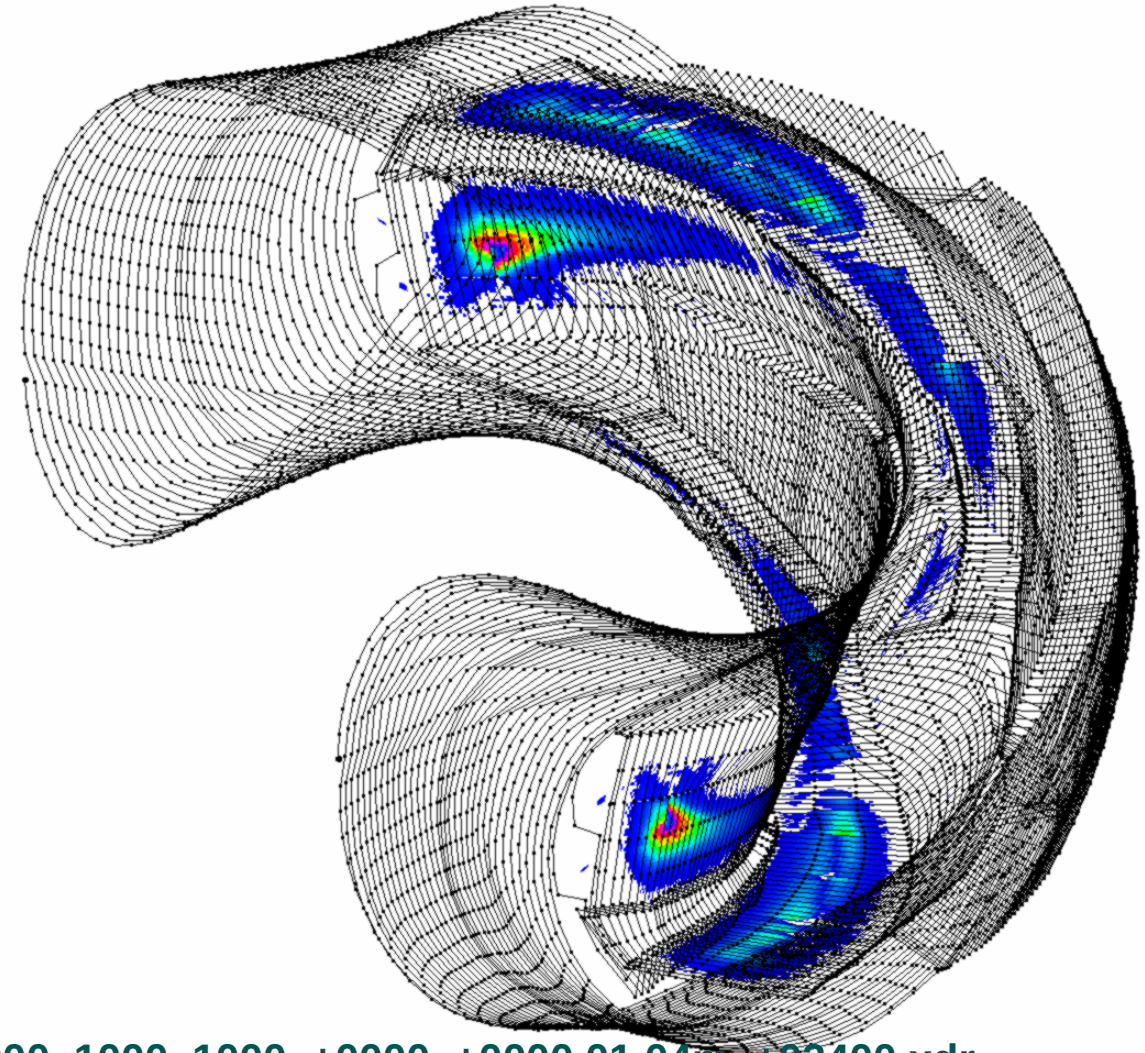
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_+02000.xdr

Originalgeometrie, Standard, Beta = 0,16 %, Itor = 20 kA



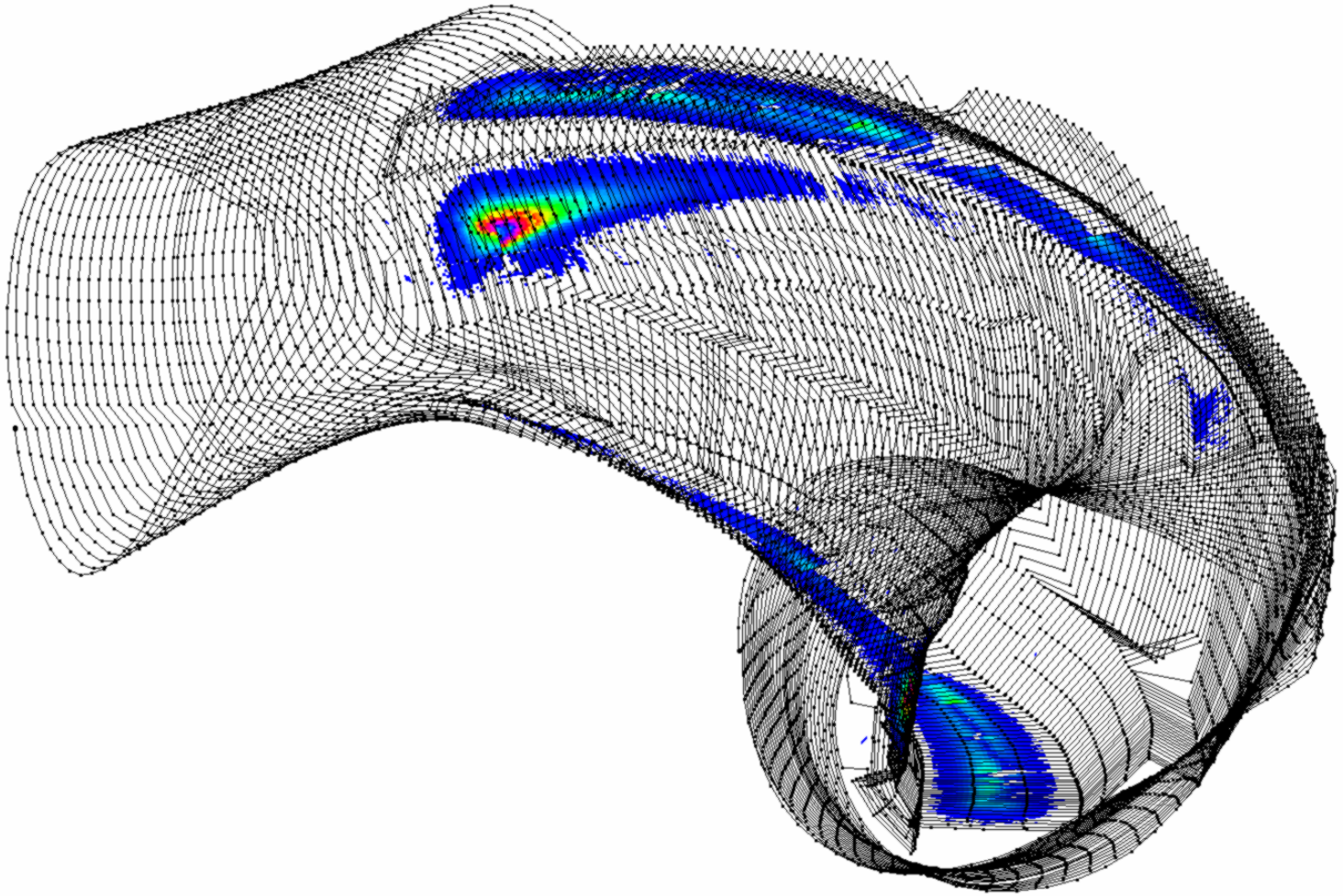
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.01_+02000.xdr

Originalgeometrie, Standard, Beta = 0,65 %, Itor = 24 kA



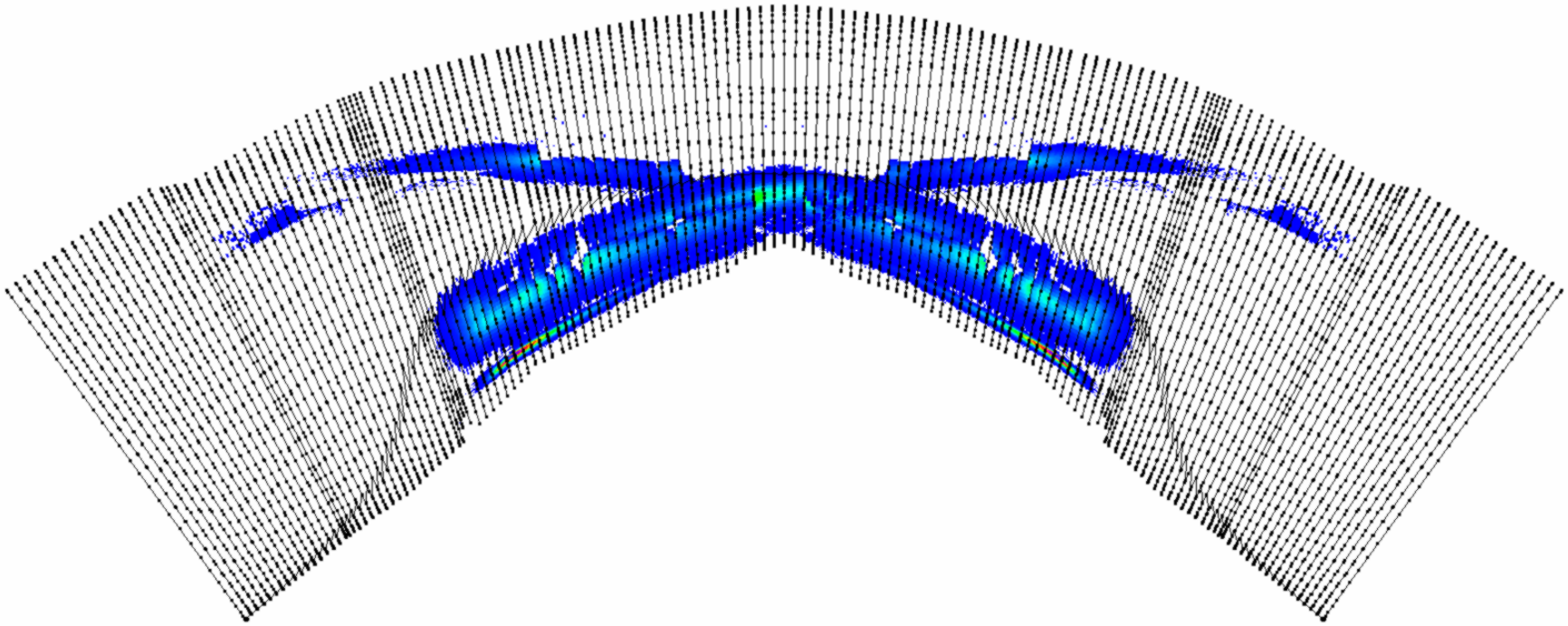
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.04m_+02400.xdr

Originalgeometrie, Standard, Beta = 0,65 %, Itor = 24 kA



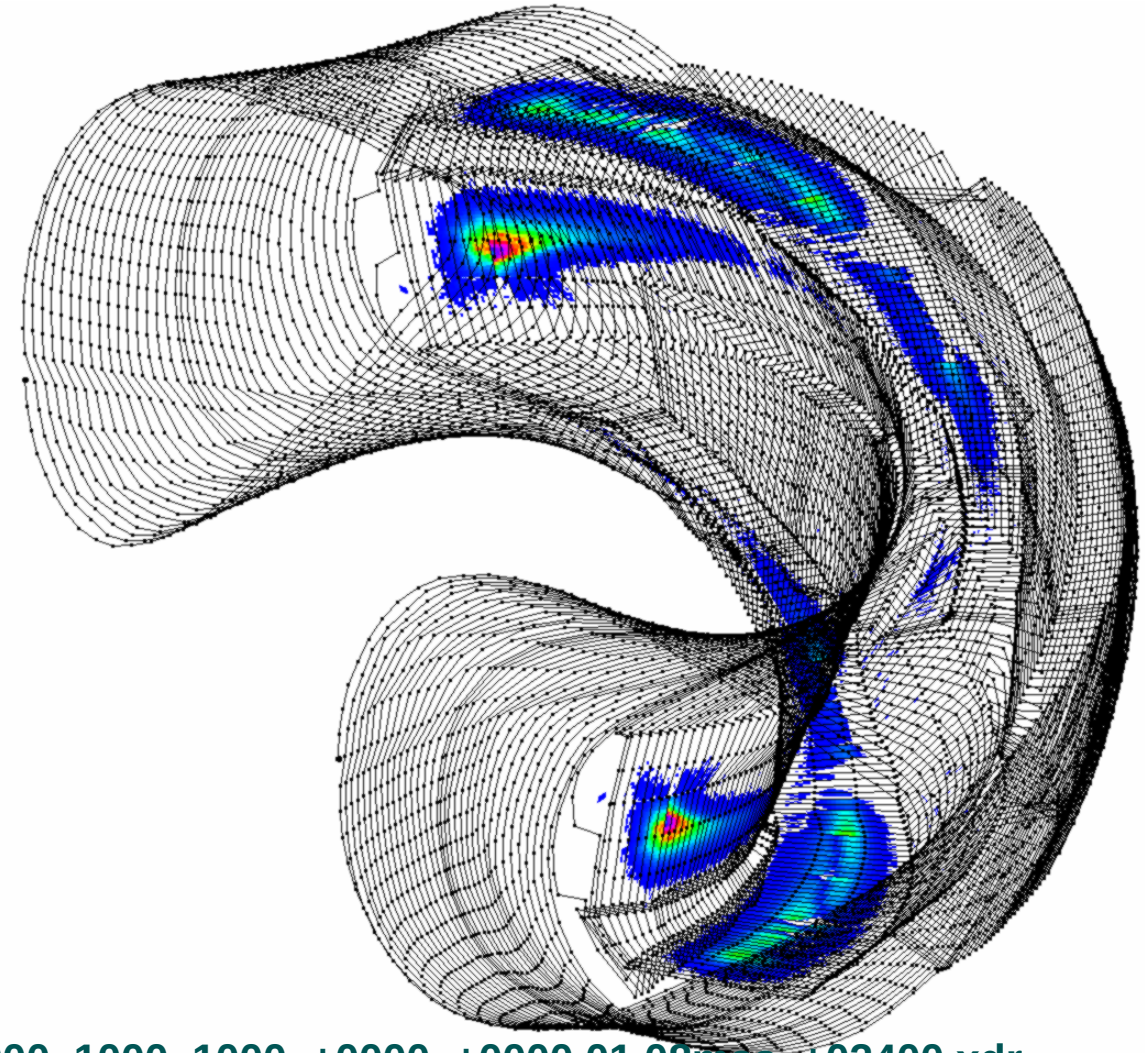
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.04m_+02400.xdr

Originalgeometrie, Standard, Beta = 0,65 %, Itor = 24 kA



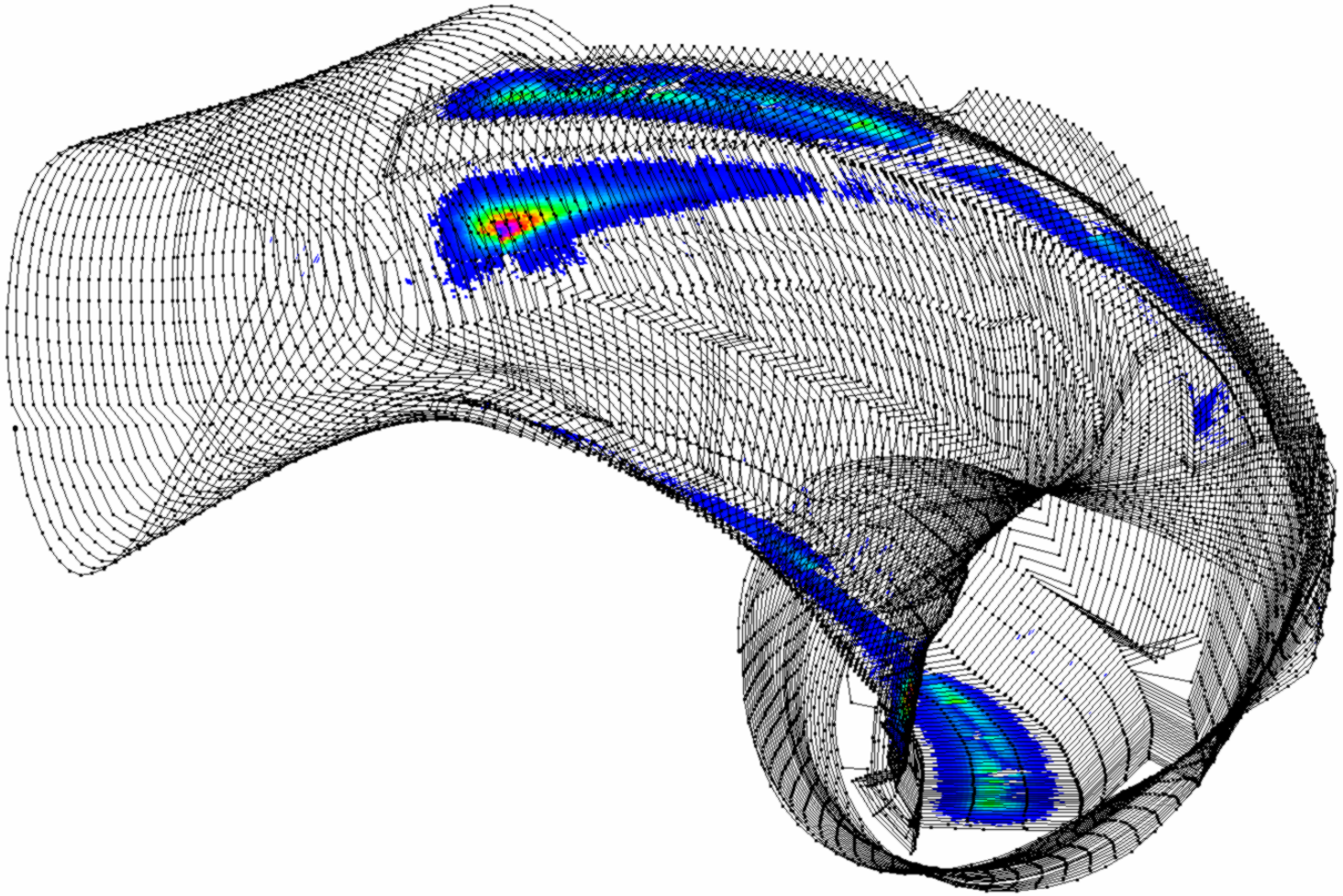
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.04m_+02400.xdr

Originalgeometrie, Standard, Beta = 1,32 %, Itor = 24 kA



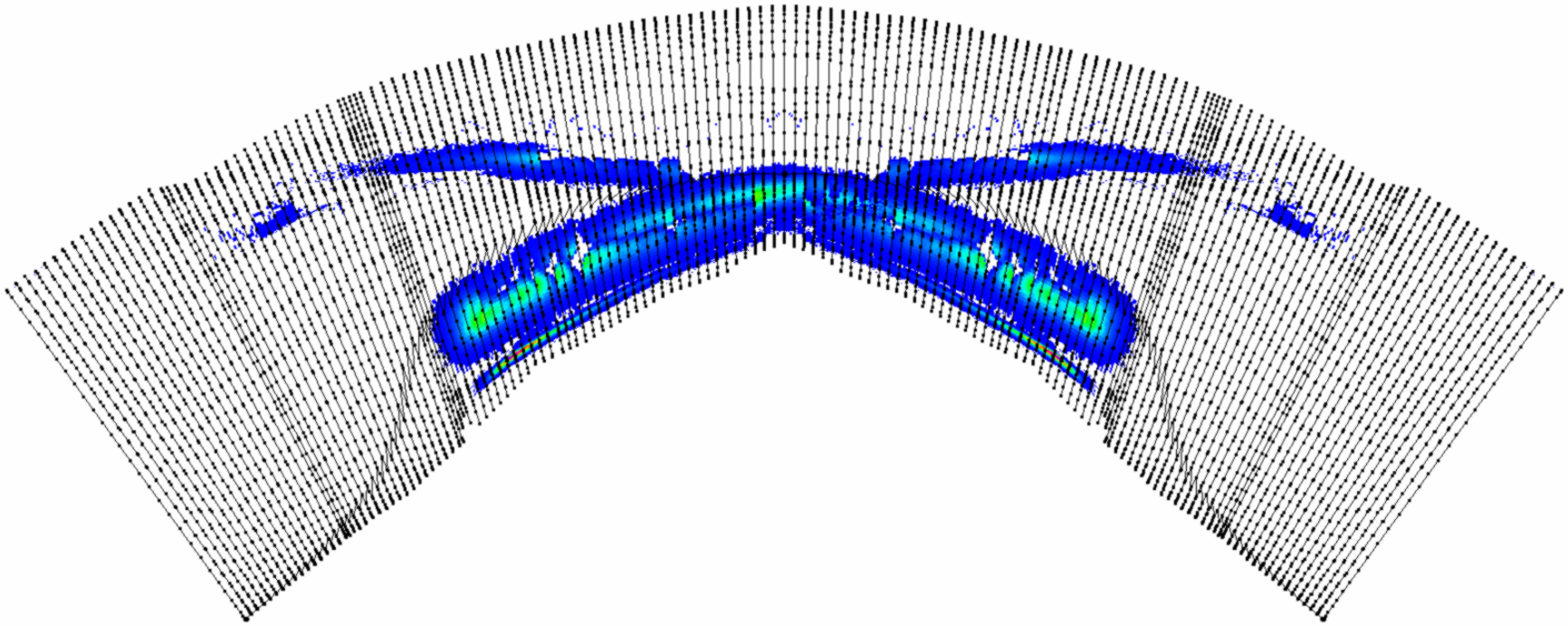
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.08mss_+02400.xdr

Originalgeometrie, Standard, Beta = 1,32 %, Itor = 24 kA



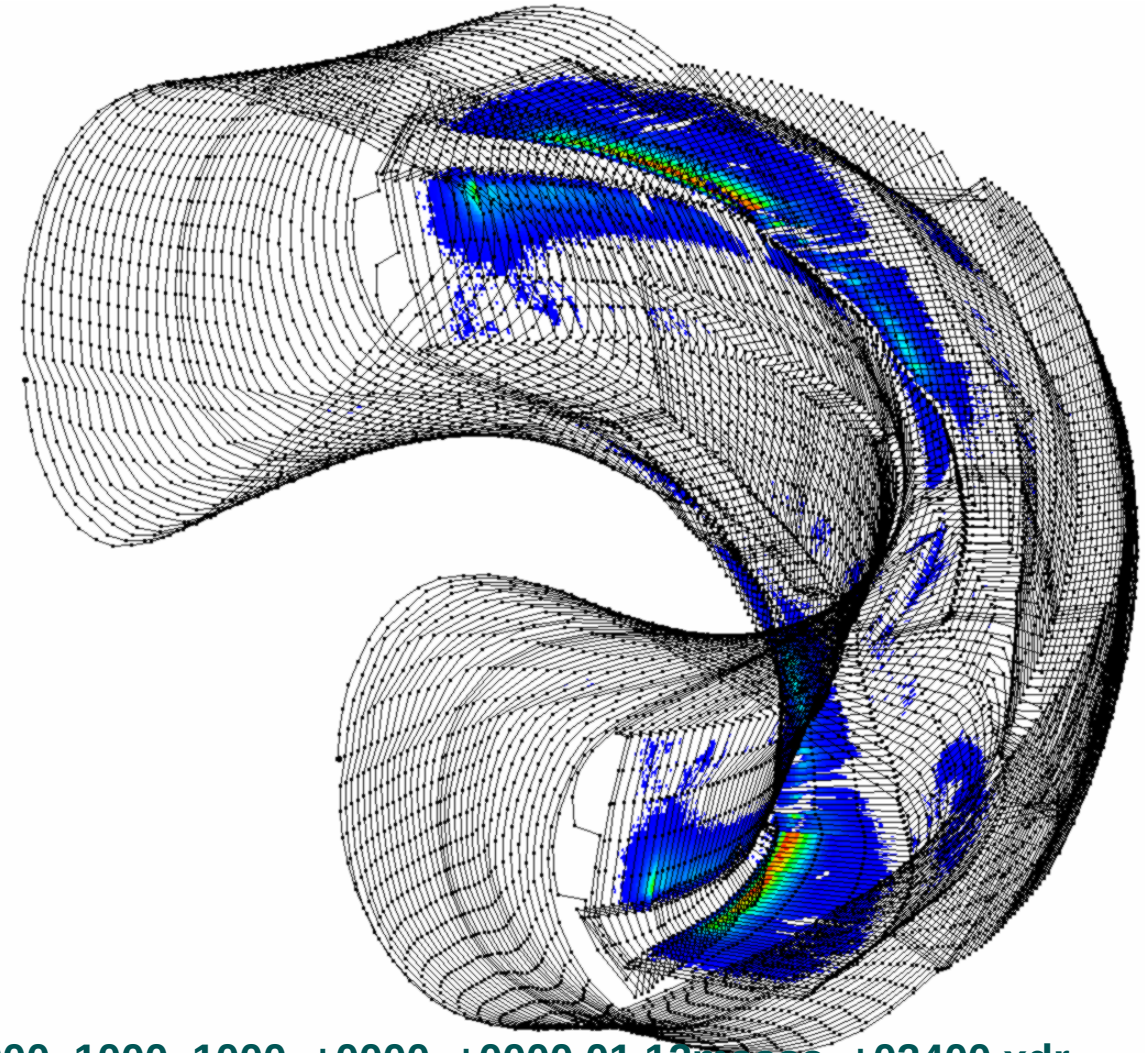
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.08mss_+02400.xdr

Originalgeometrie, Standard, Beta = 1,32 %, Itor = 24 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_+0000_+0000.01.08mss_+02400.xdr

Originalgeometrie, Standard, Beta = 2,0 %, Itor = 24 kA ???



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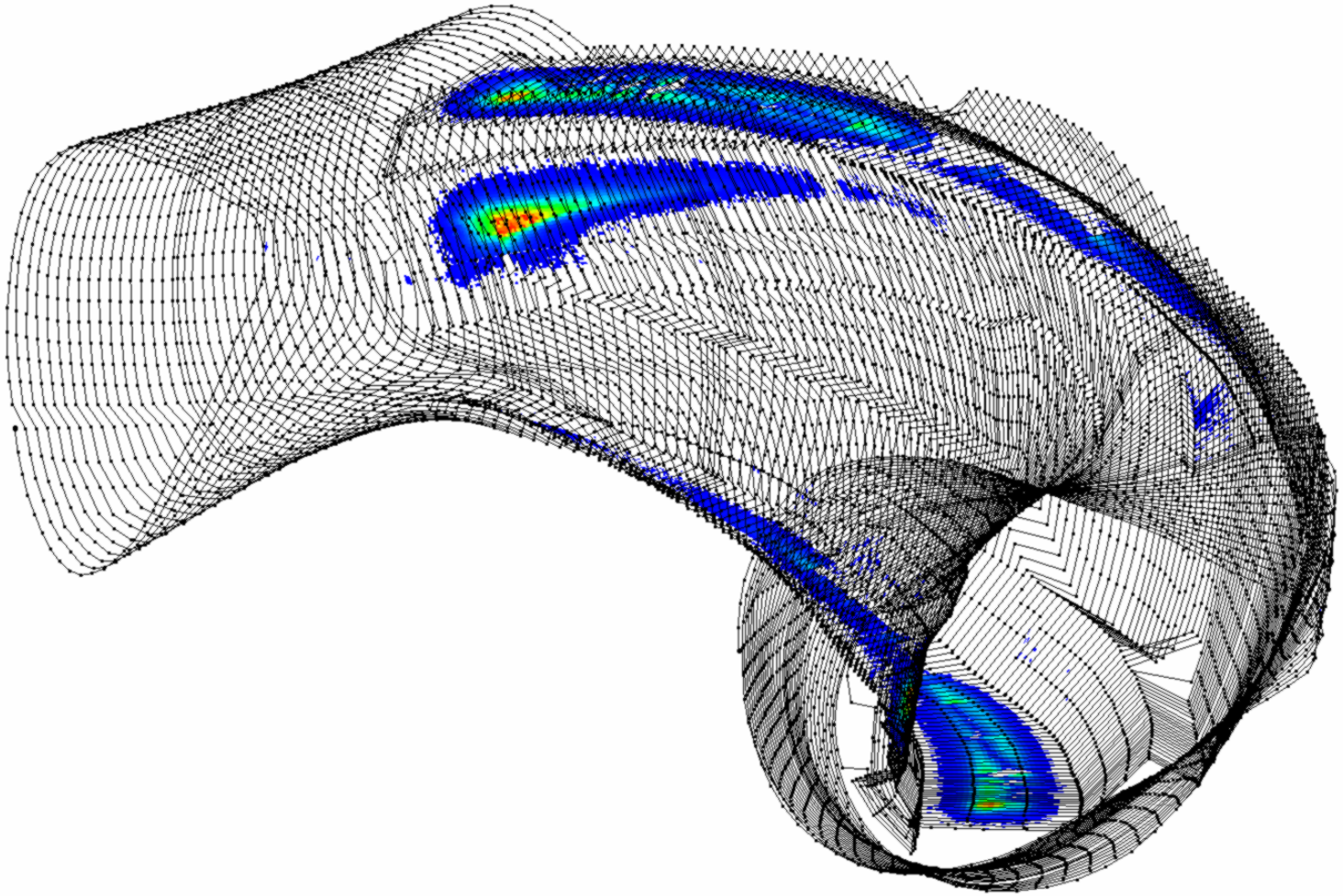
Originalgeometrie, Standard, Beta = 2,0 %, Itor = 24 kA ???



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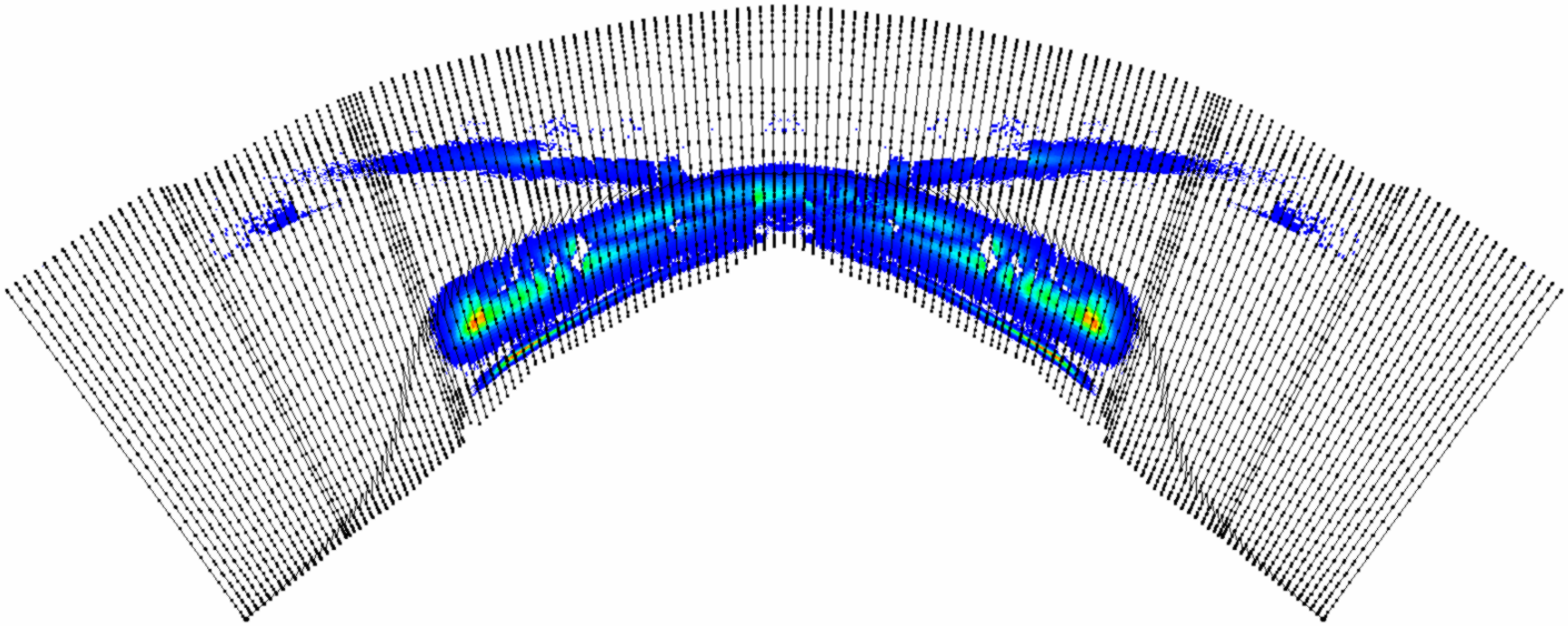
Originalgeometrie, Standard, Beta = 2,0 %, Itor = 24 kA ???



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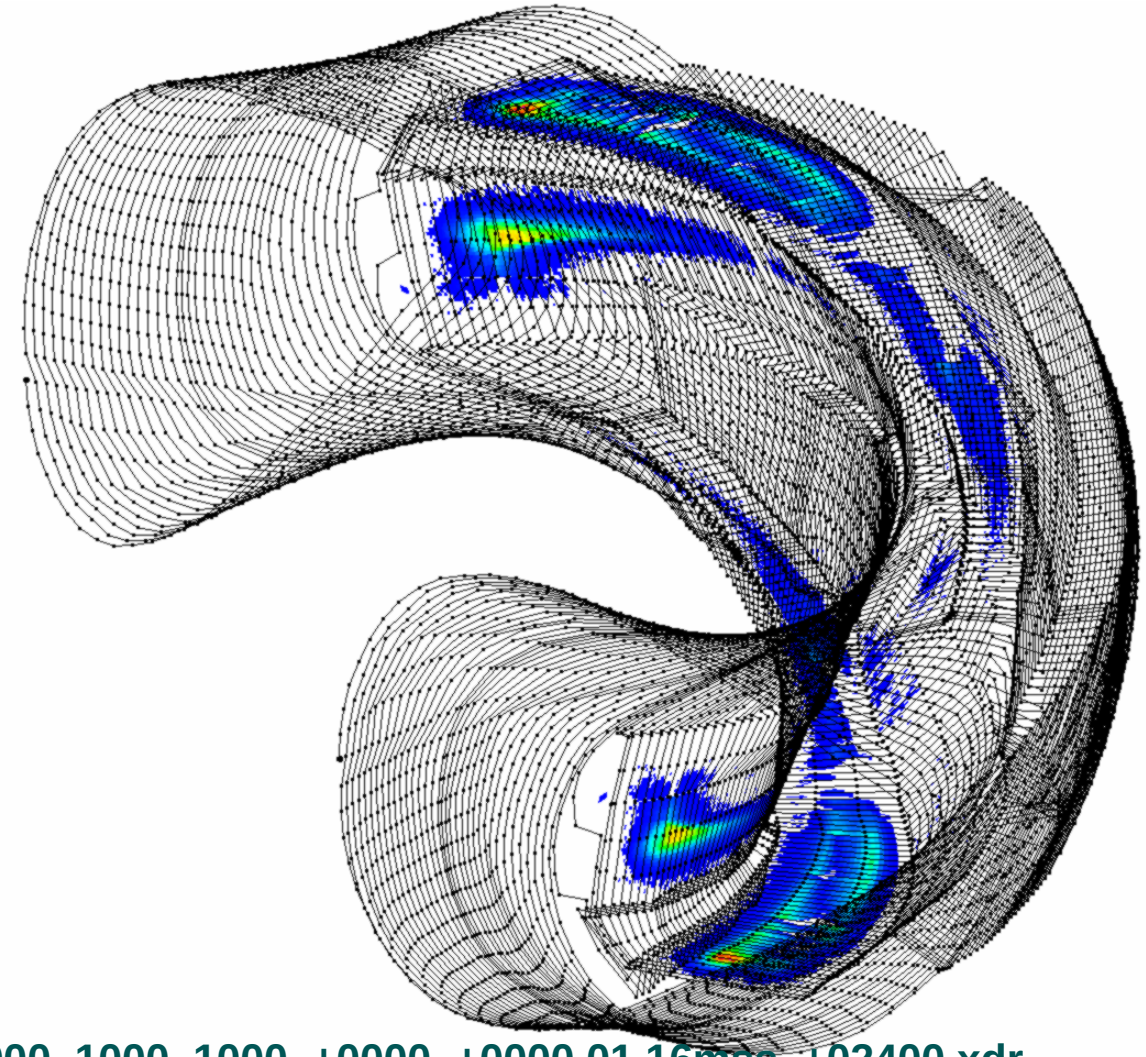
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 24 kA



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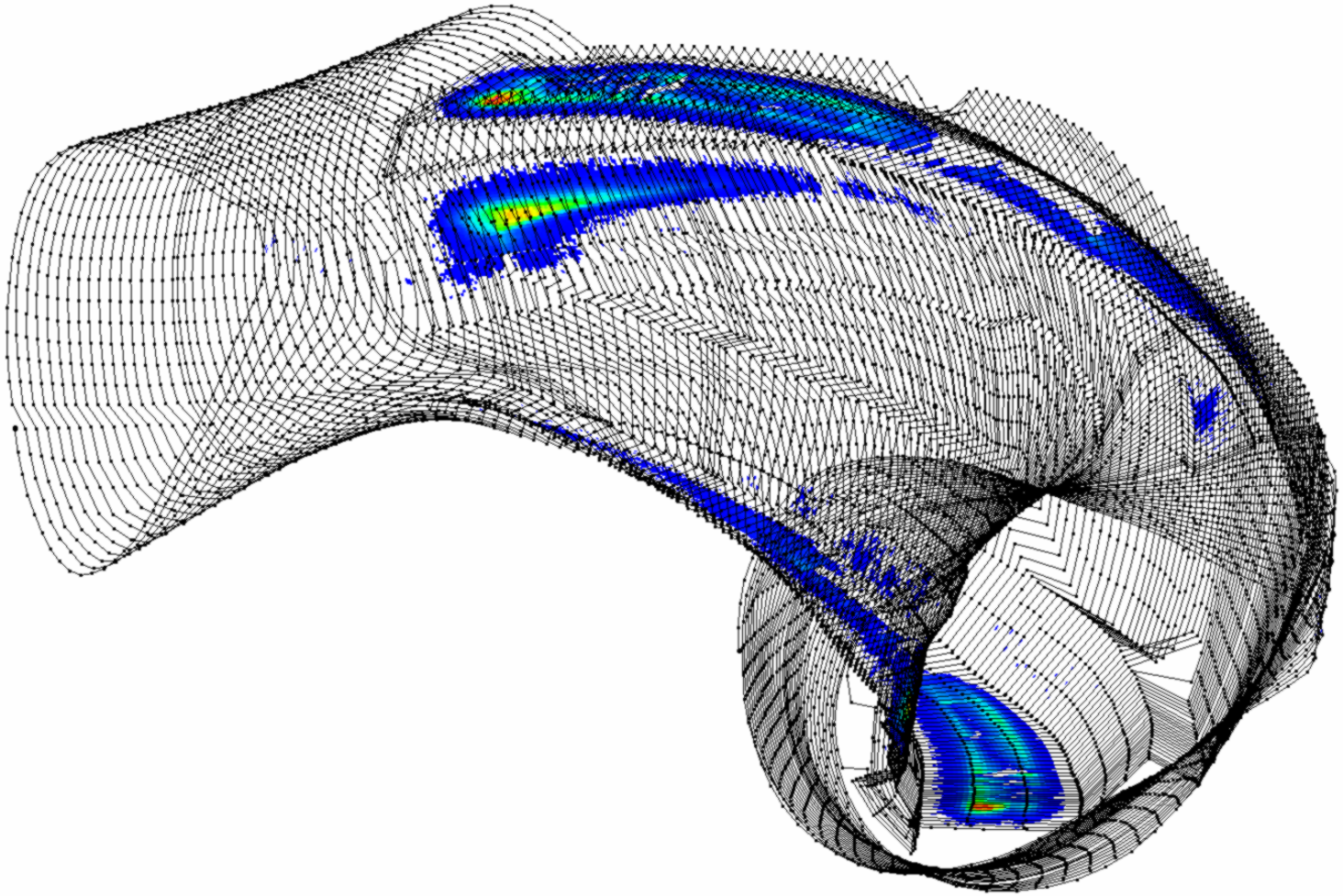
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 24 kA



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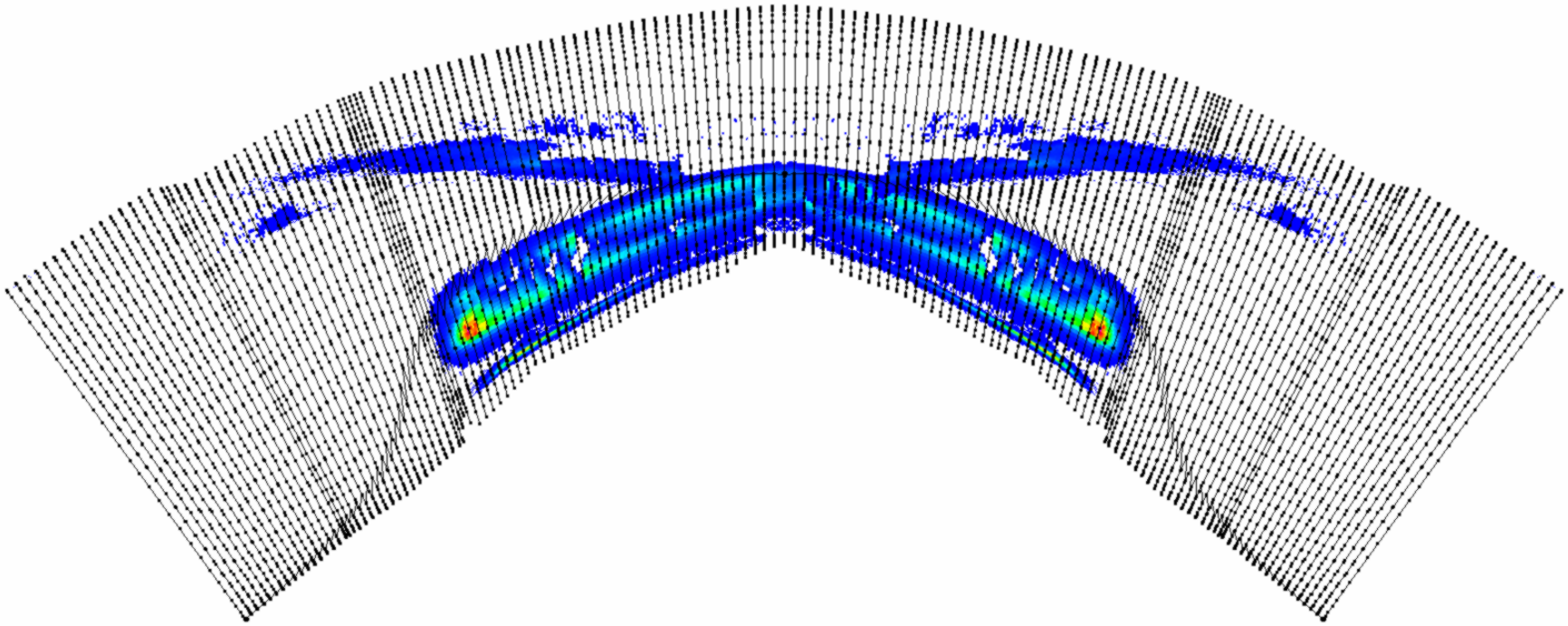
Originalgeometrie, Standard, Beta = 2,69 %, Itor = 24 kA



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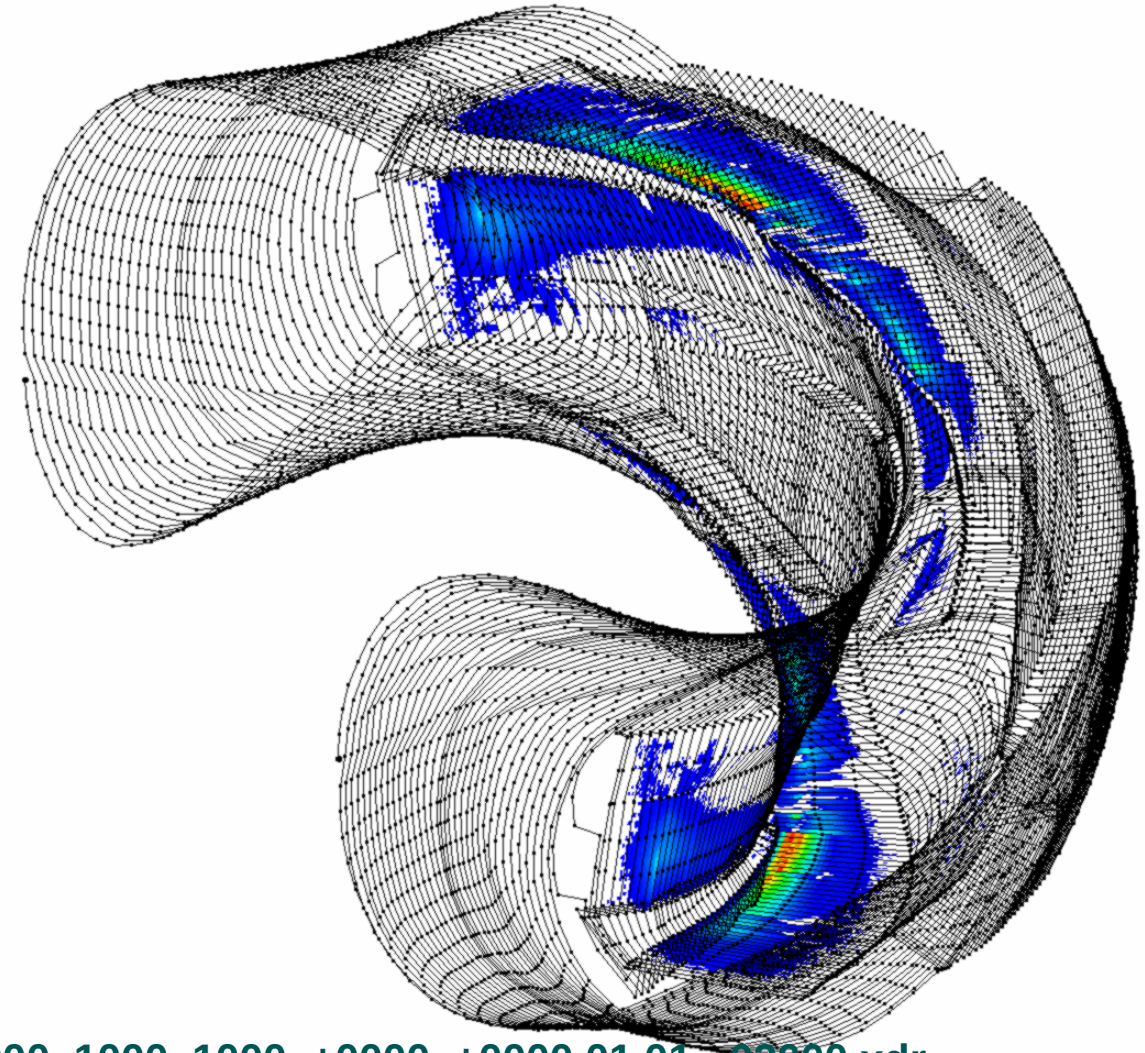
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -20 kA



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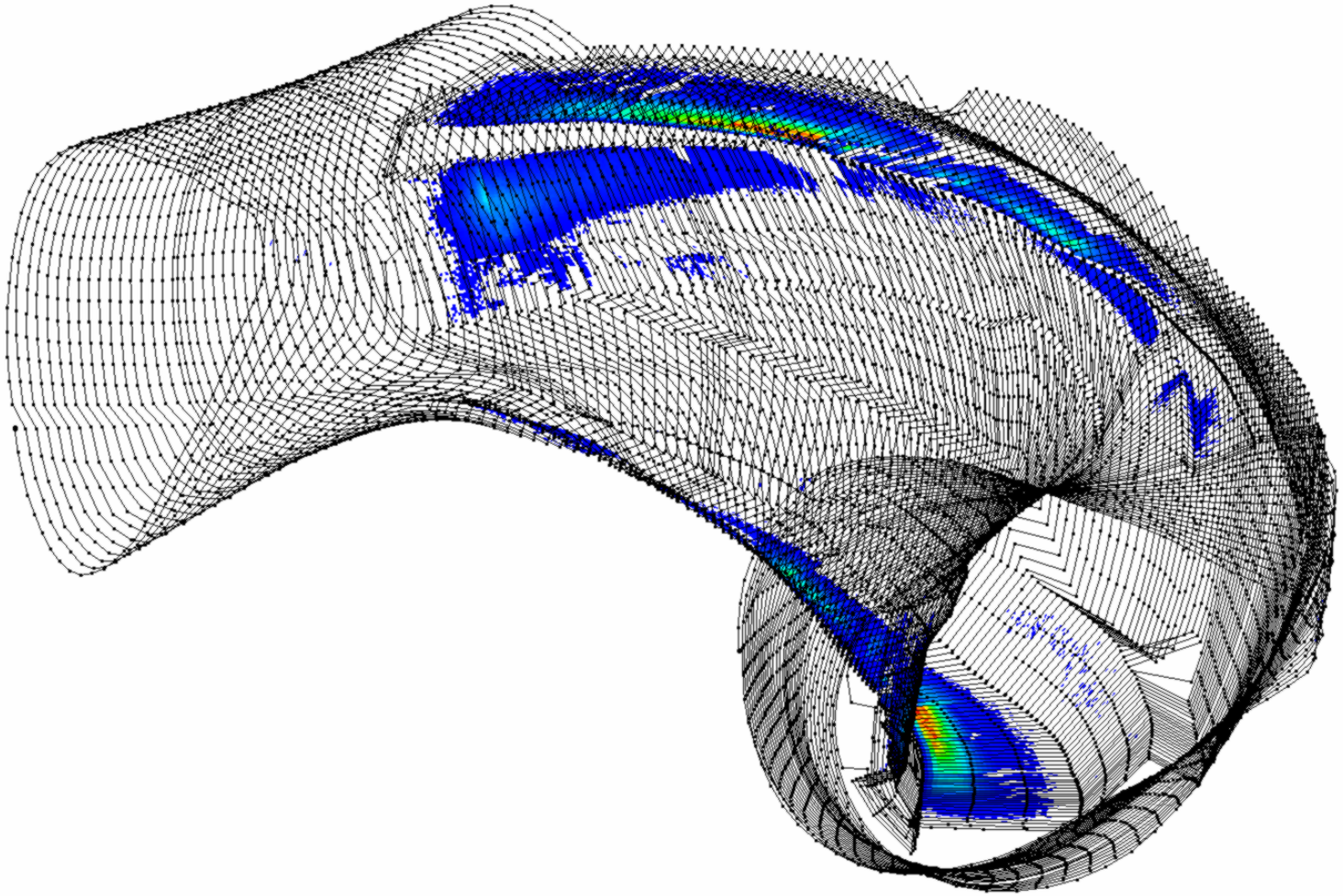
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -20 kA



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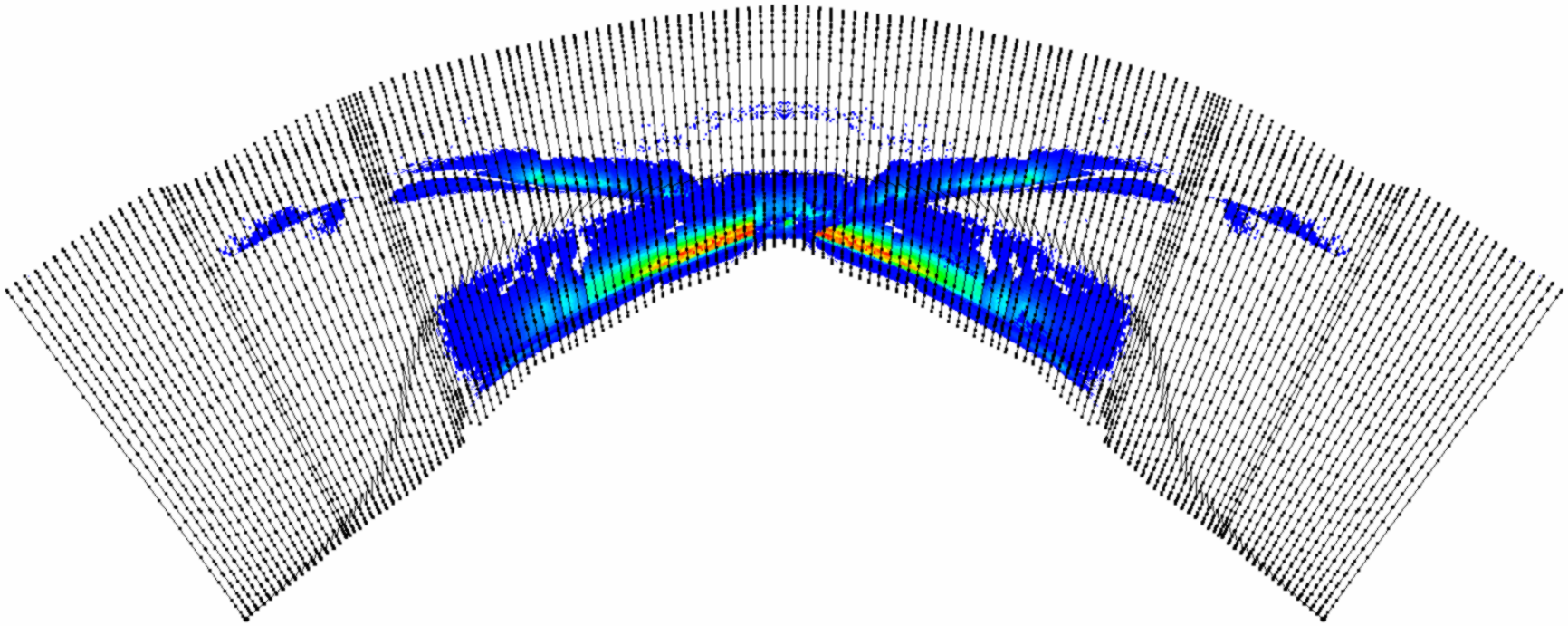
Originalgeometrie, Standard, Beta = 0,16 %, Itor = -20 kA



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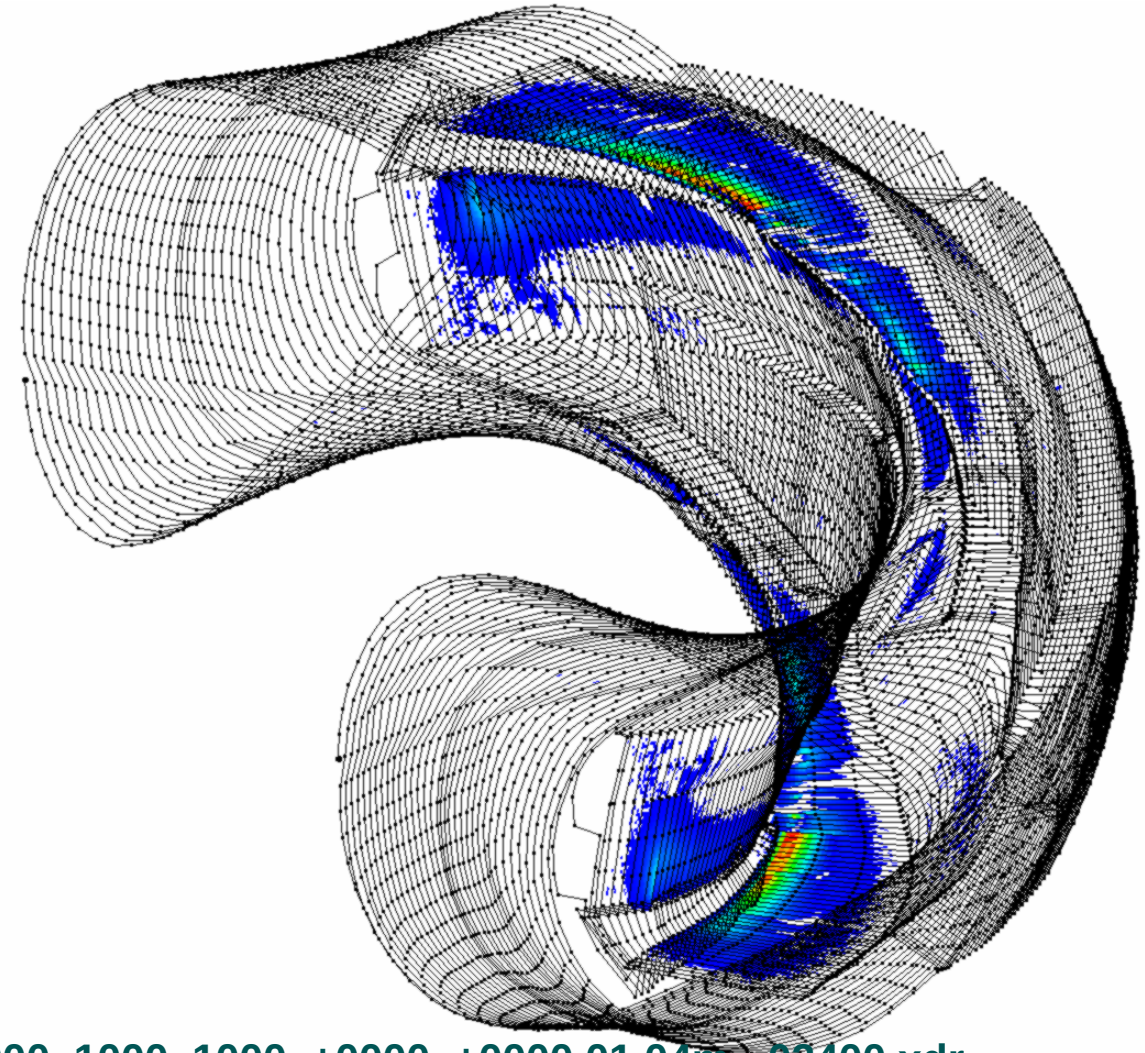
Originalgeometrie, Standard, Beta = 0,65 %, Itor = -24 kA



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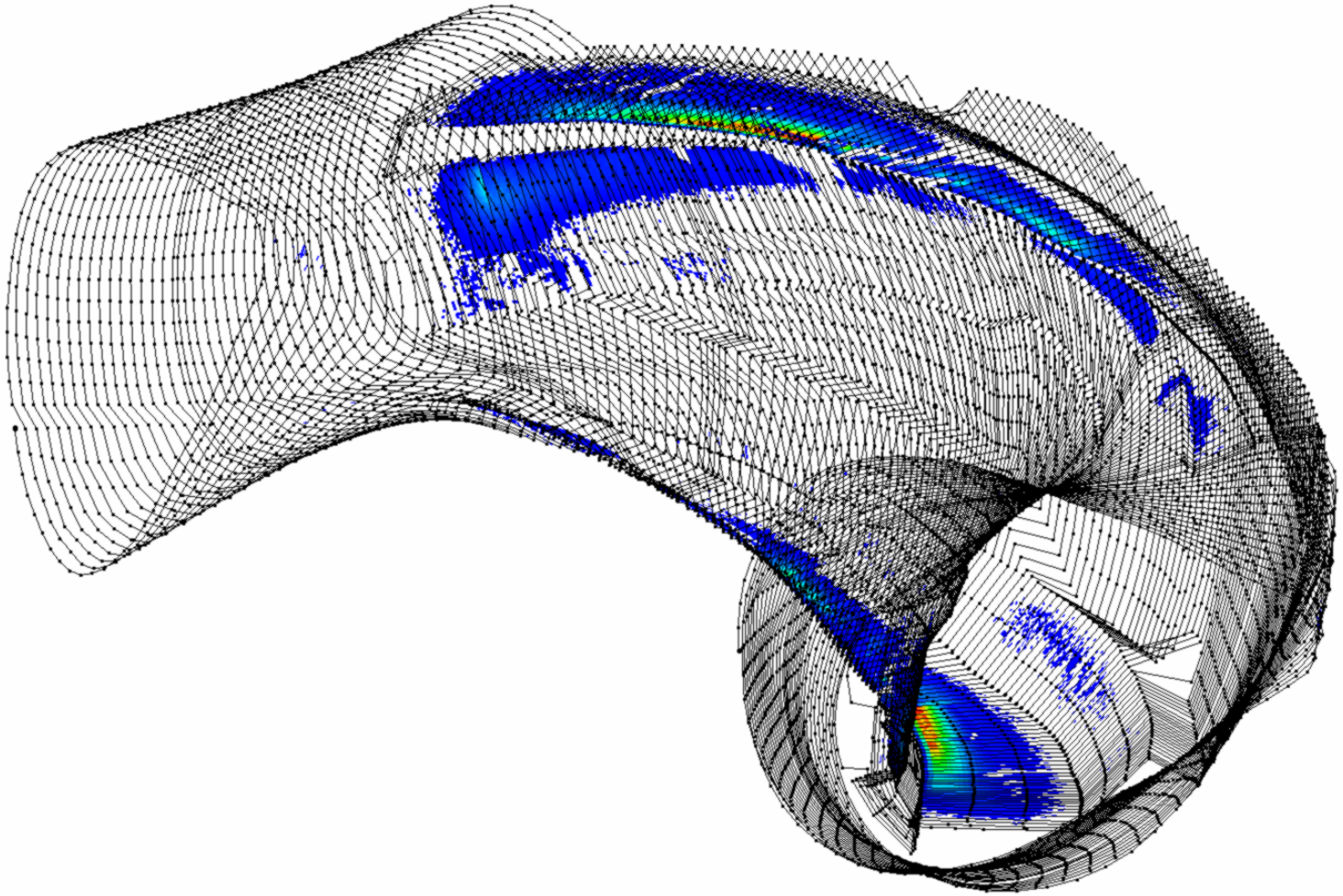
Originalgeometrie, Standard, Beta = 0,65 %, Itor = -24 kA



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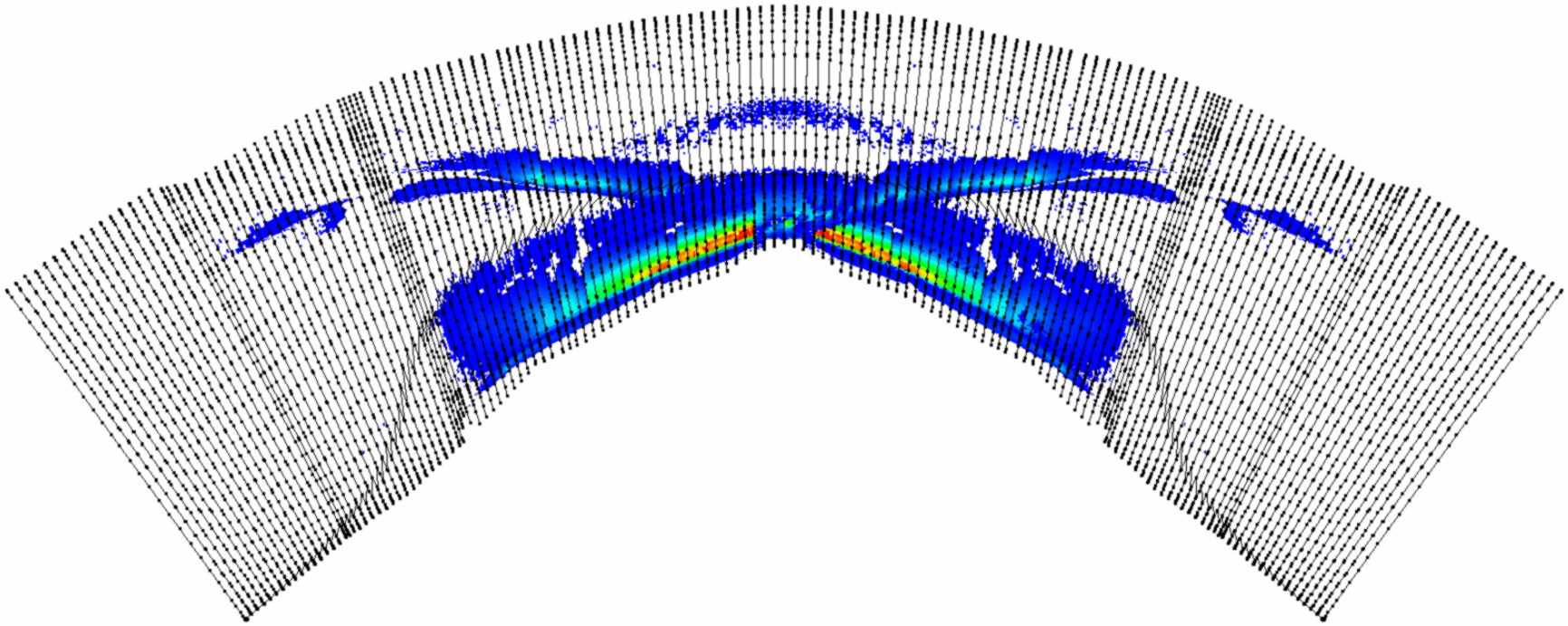
Originalgeometrie, Standard, Beta = 0,65 %, Itor = -24 kA



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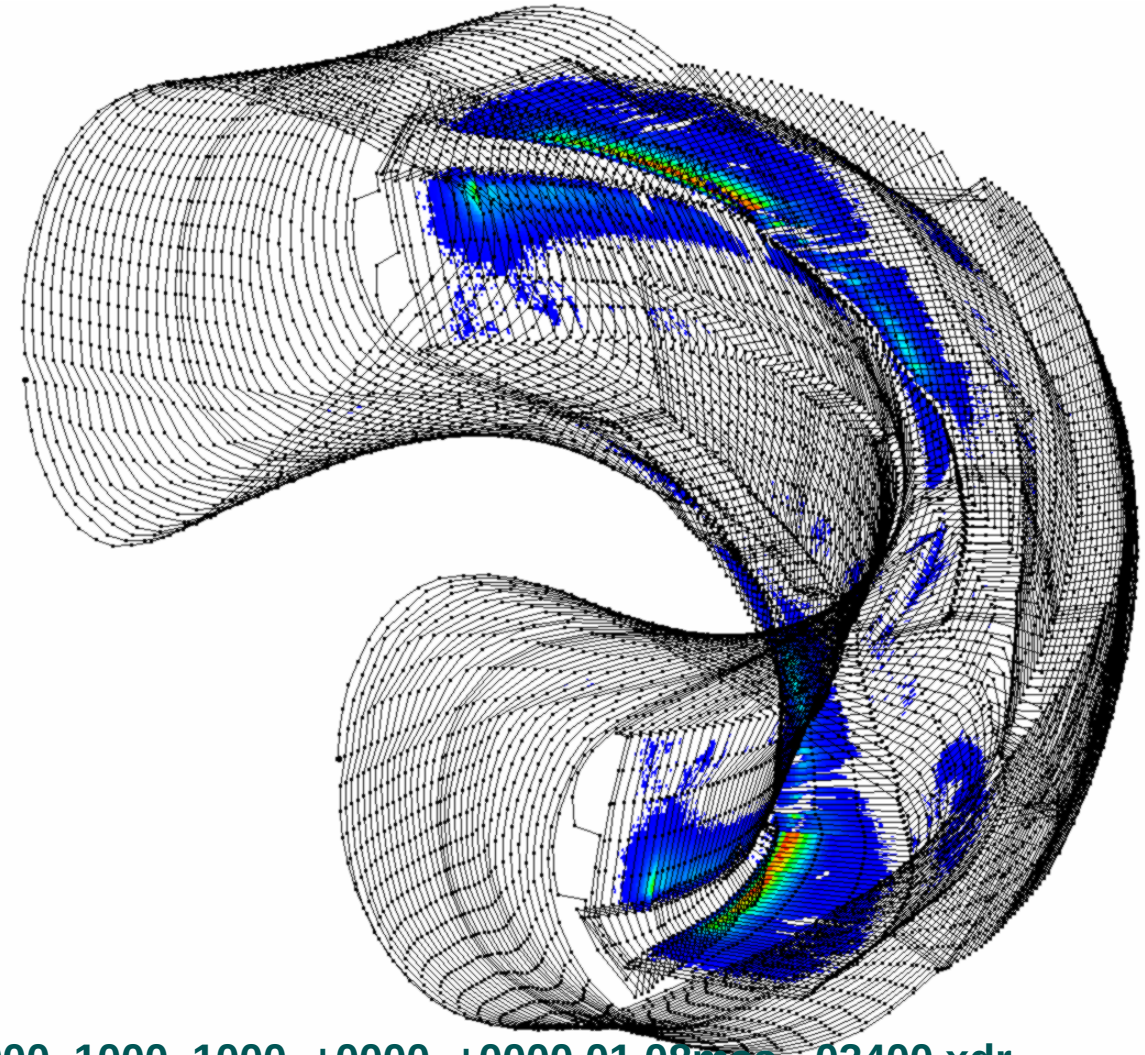
Originalgeometrie, Standard, Beta = 1,32 %, Itor = -24 kA



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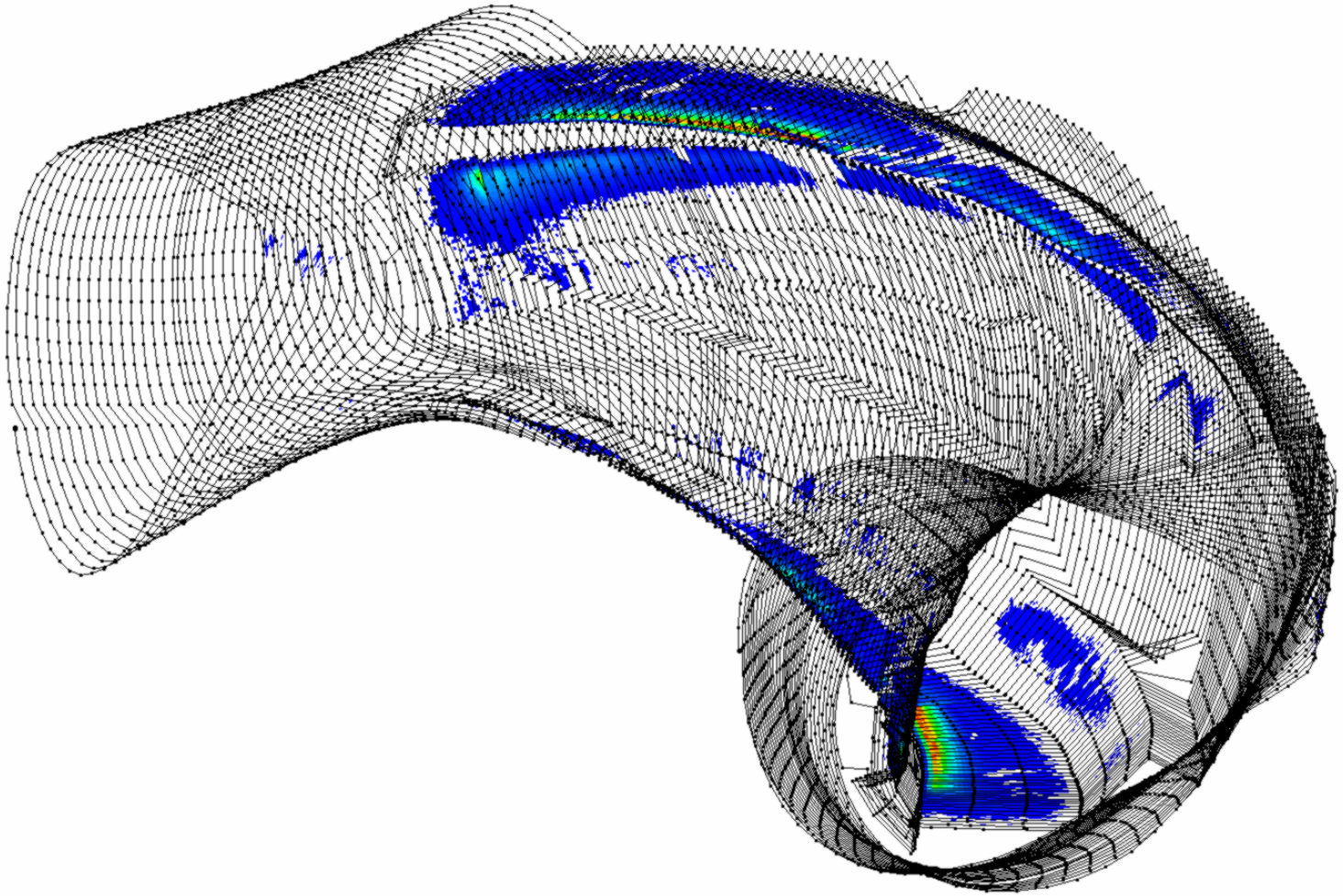
Originalgeometrie, Standard, Beta = 1,32 %, Itor = -24 kA



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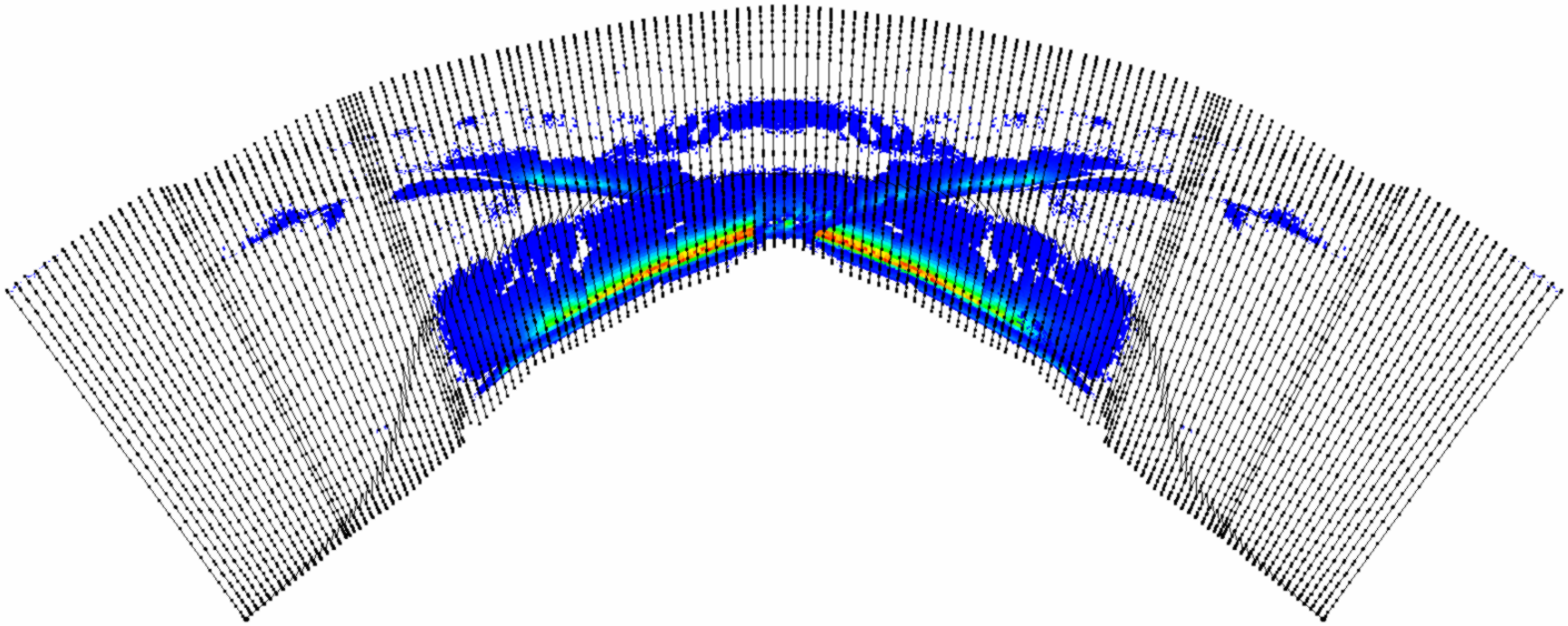
Originalgeometrie, Standard, Beta = 1,32 %, Itor = -24 kA



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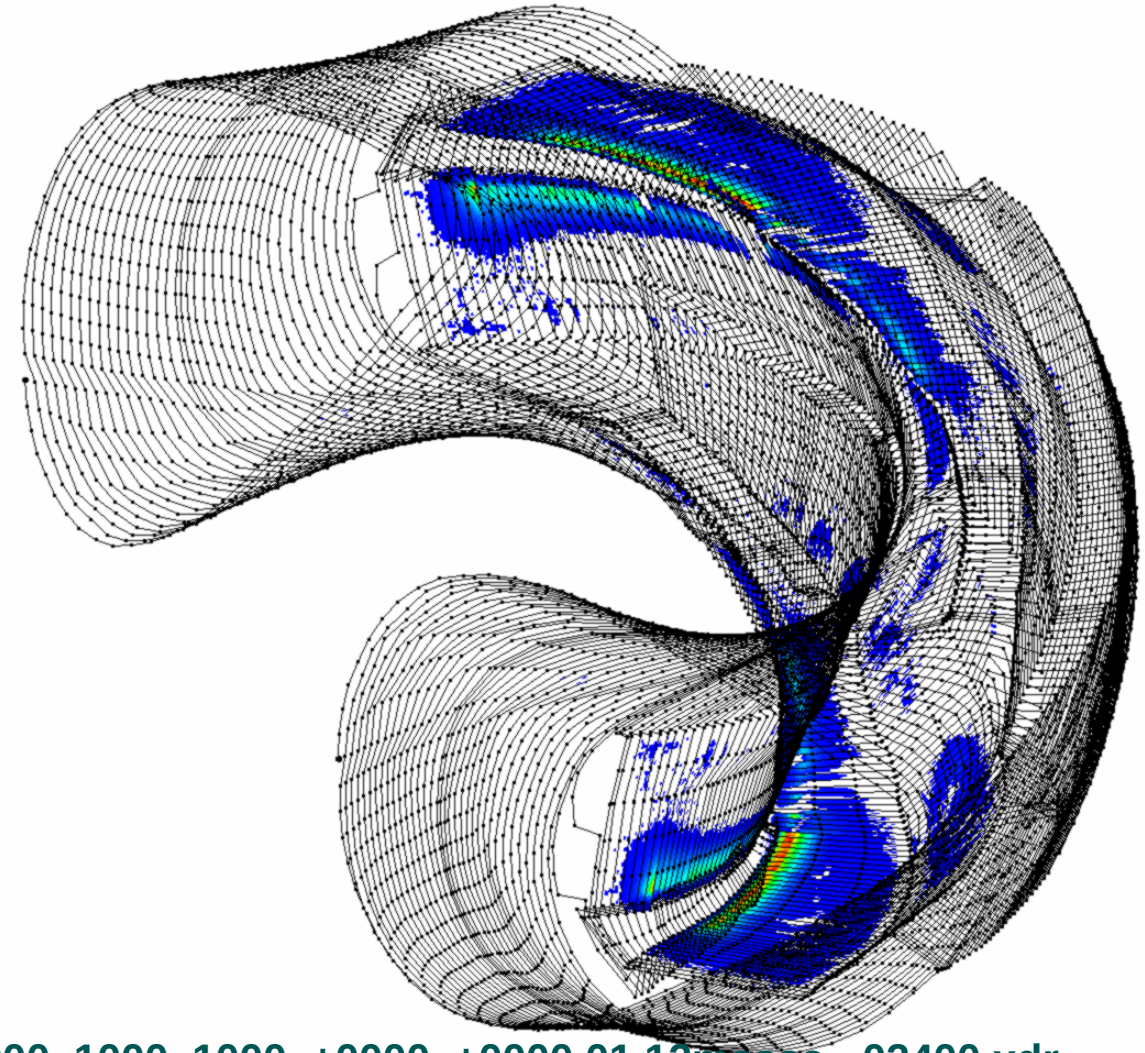
Originalgeometrie, Standard, Beta = 2,0 %, Itor = -24 kA



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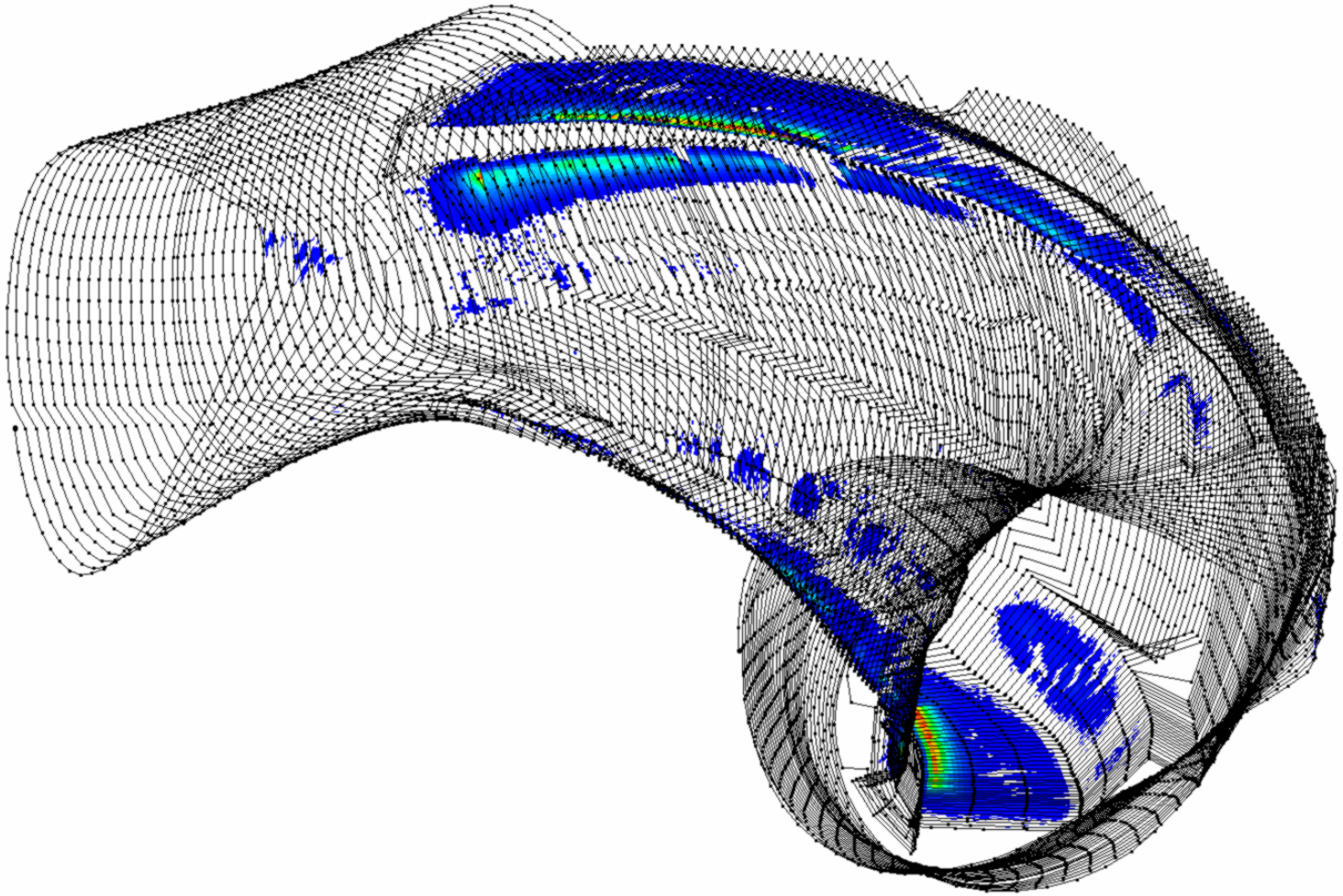
Originalgeometrie, Standard, Beta = 2,0 %, Itor = -24 kA



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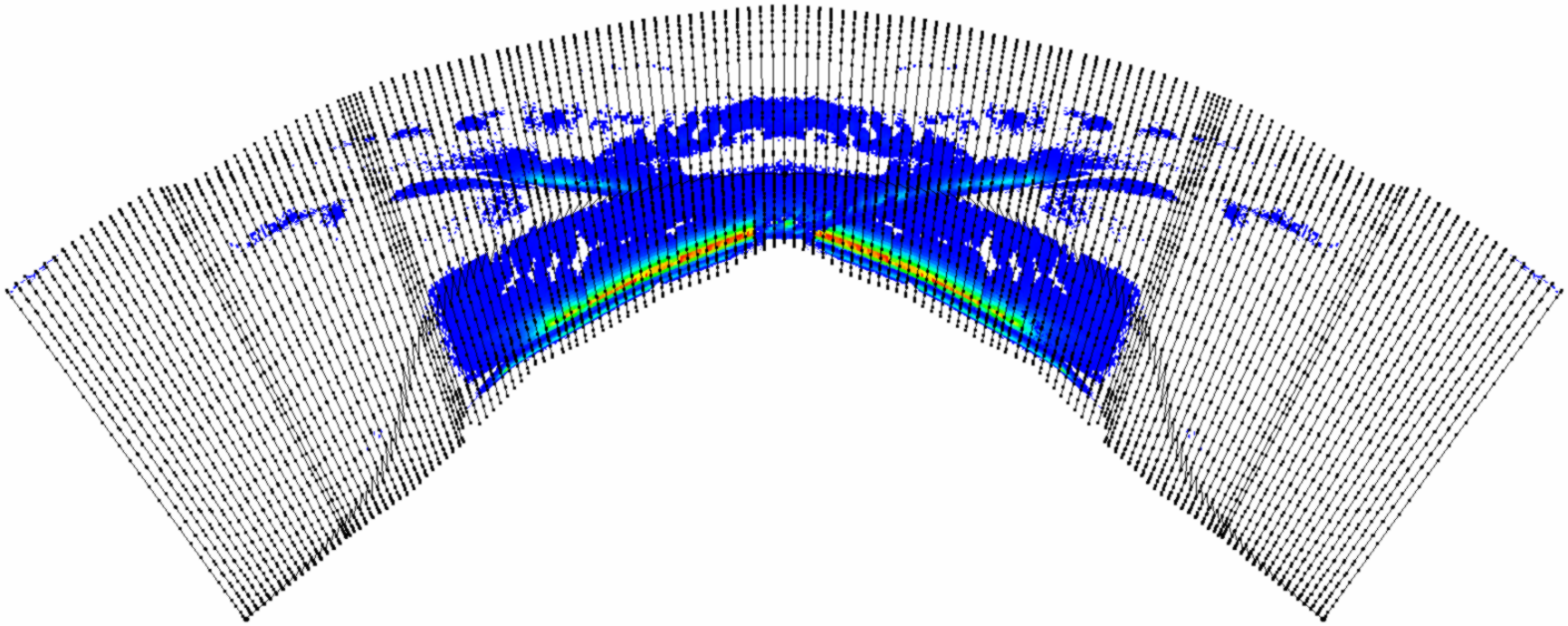
Originalgeometrie, Standard, Beta = 2,0 %, Itor = -24 kA



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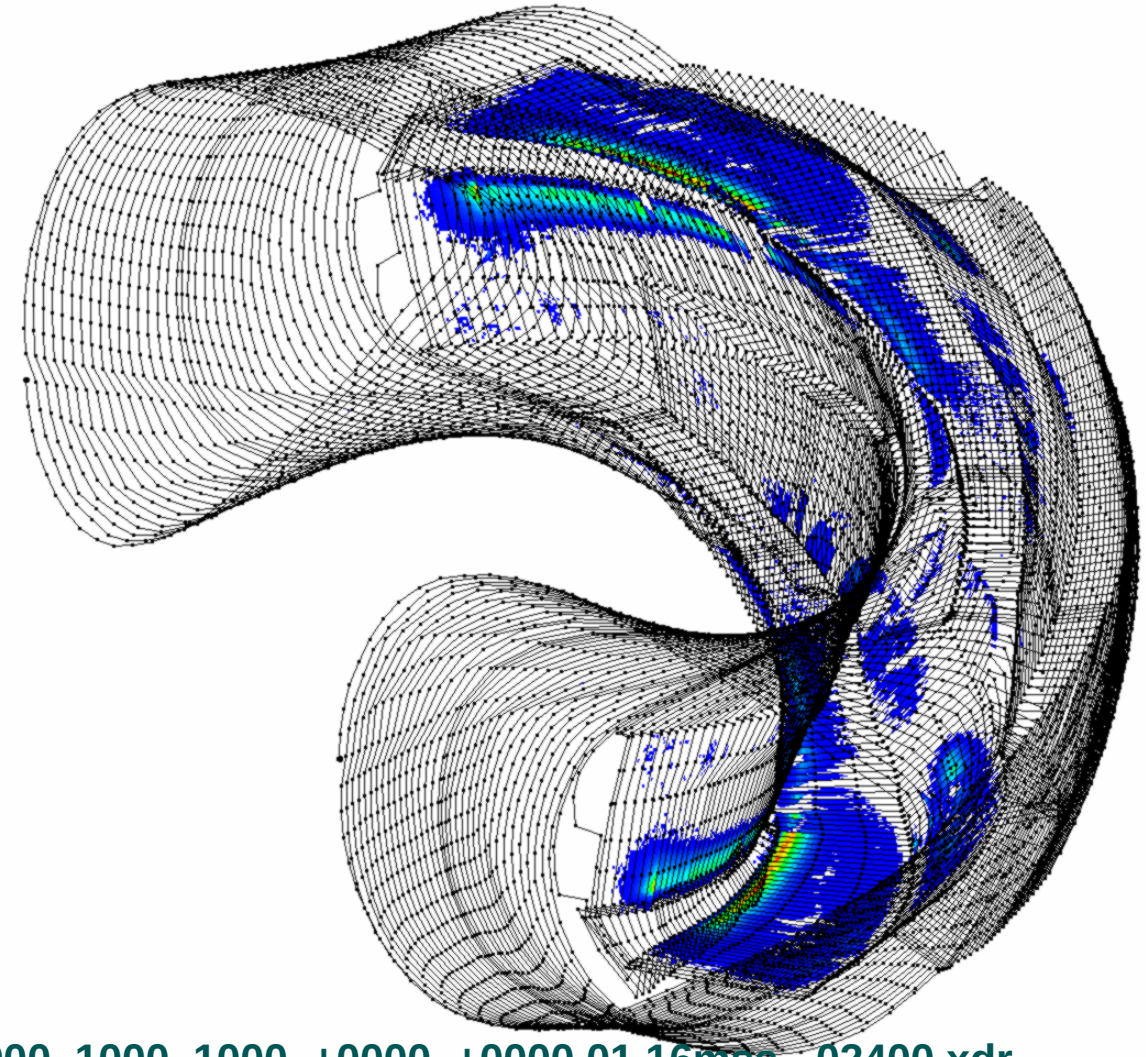
Originalgeometrie, Standard, Beta = 2,69 %, Itor = -24 kA



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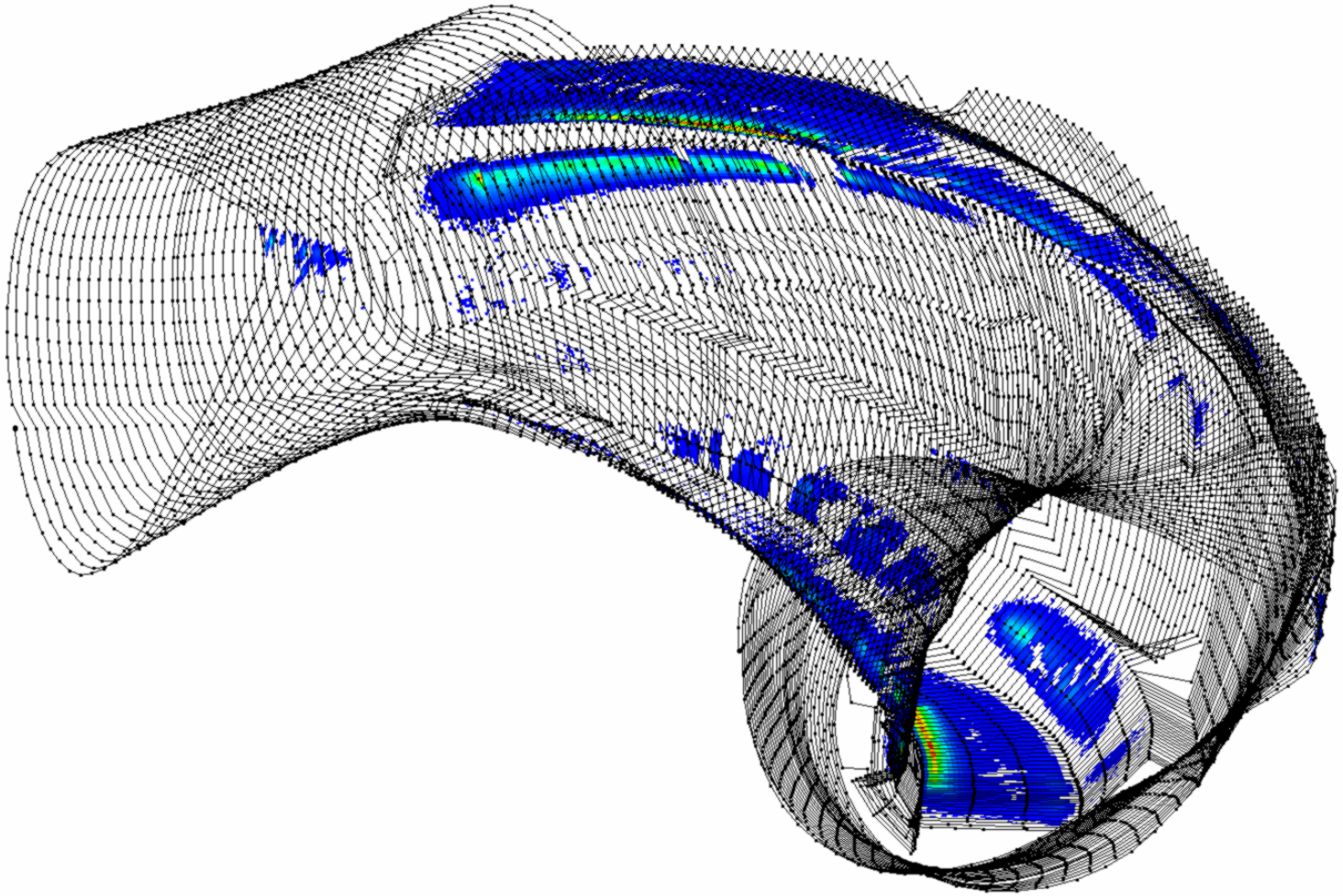
Originalgeometrie, Standard, Beta = 2,69 %, Itor = -24 kA



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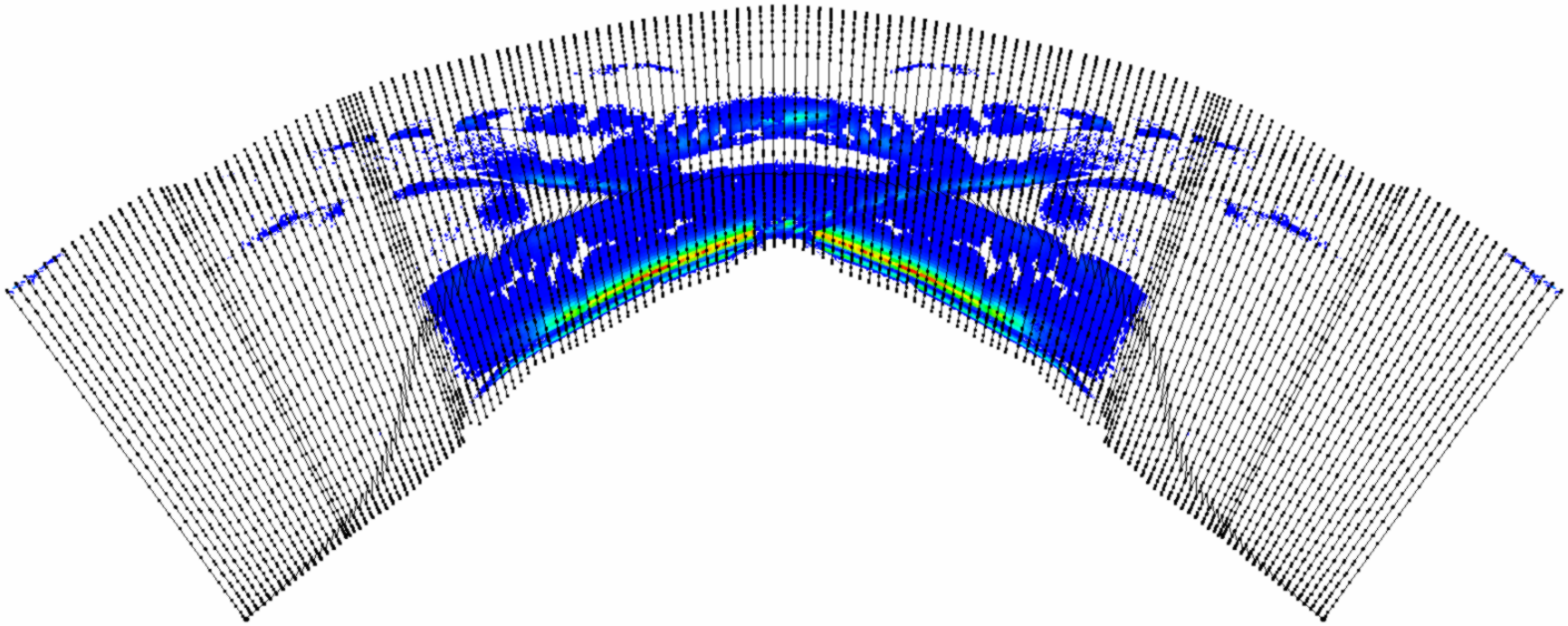
Originalgeometrie, Standard, Beta = 2,69 %, Itor = -24 kA



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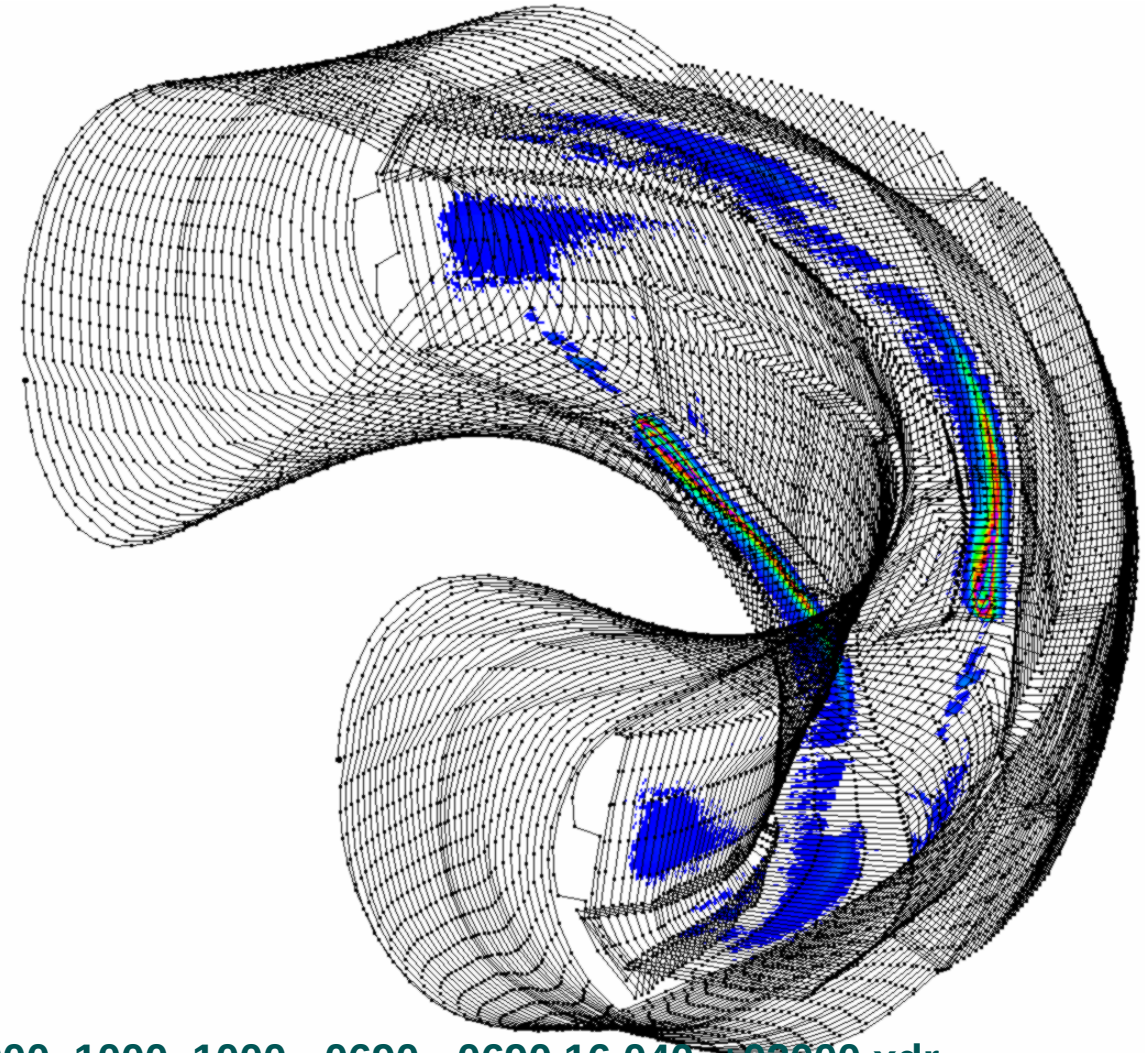
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 20 kA



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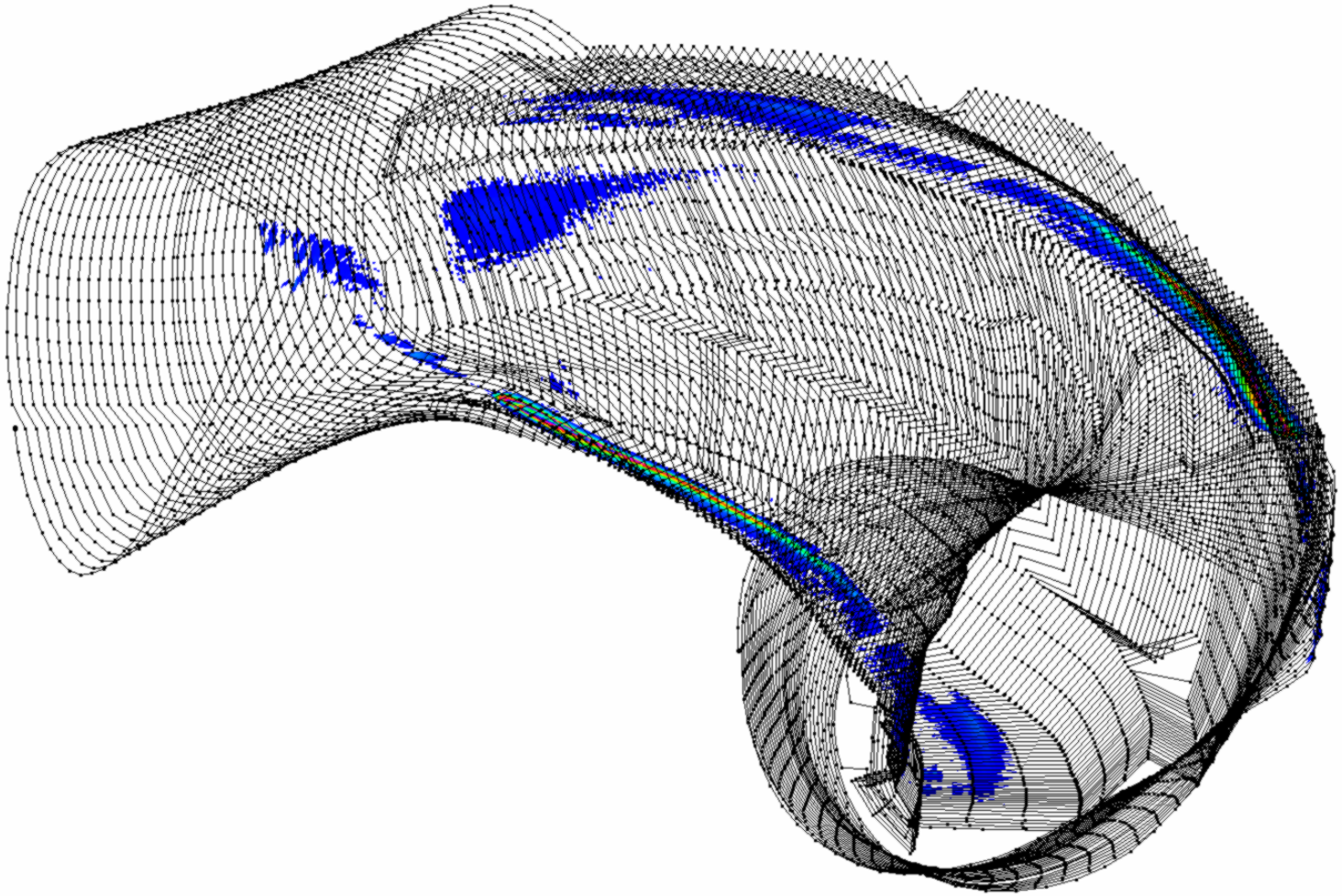
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 20 kA



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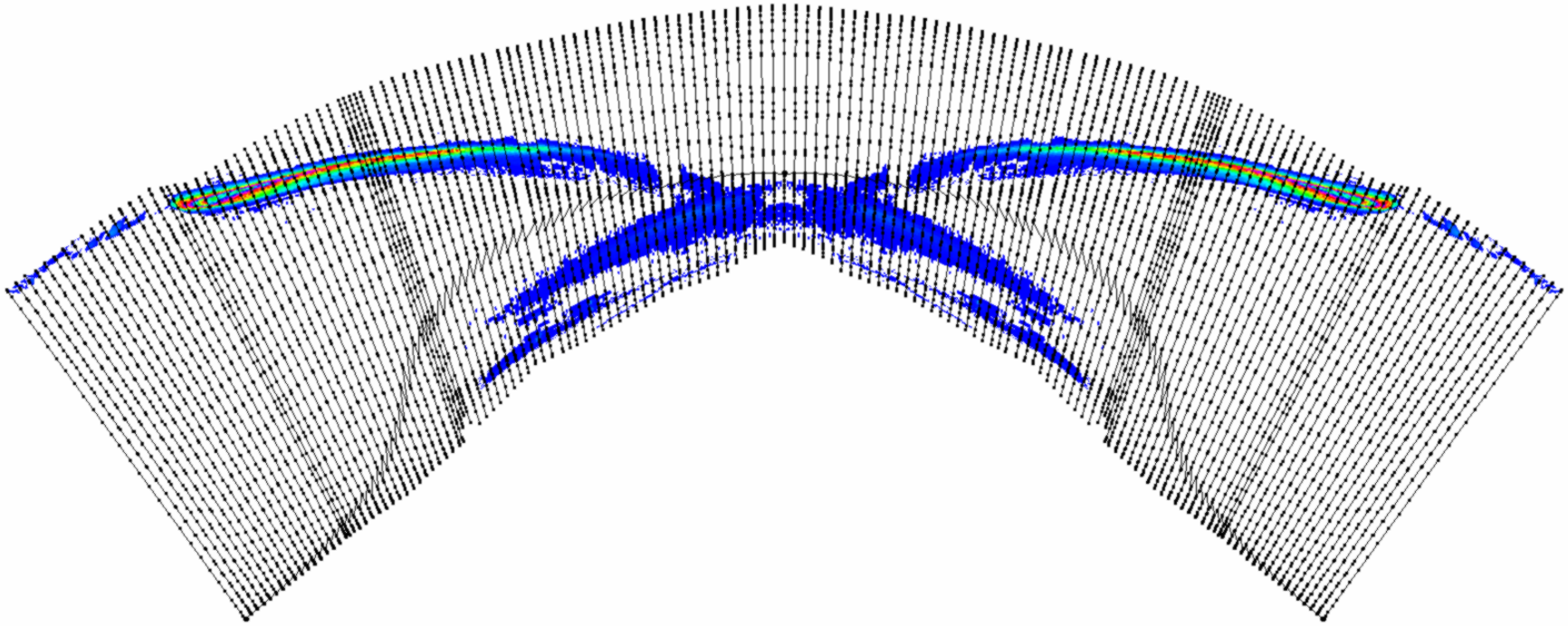
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = 20 kA



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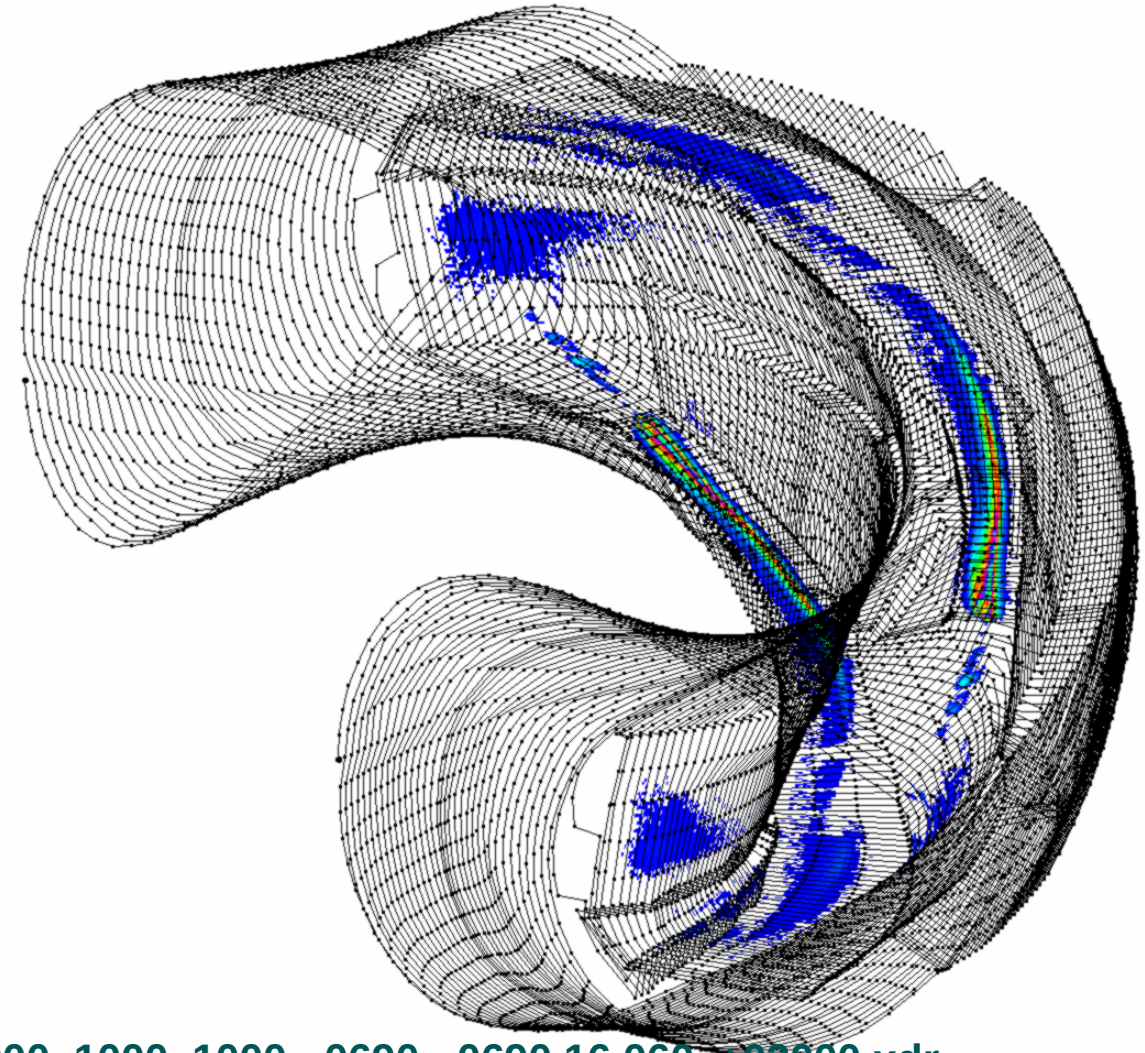
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 20 kA



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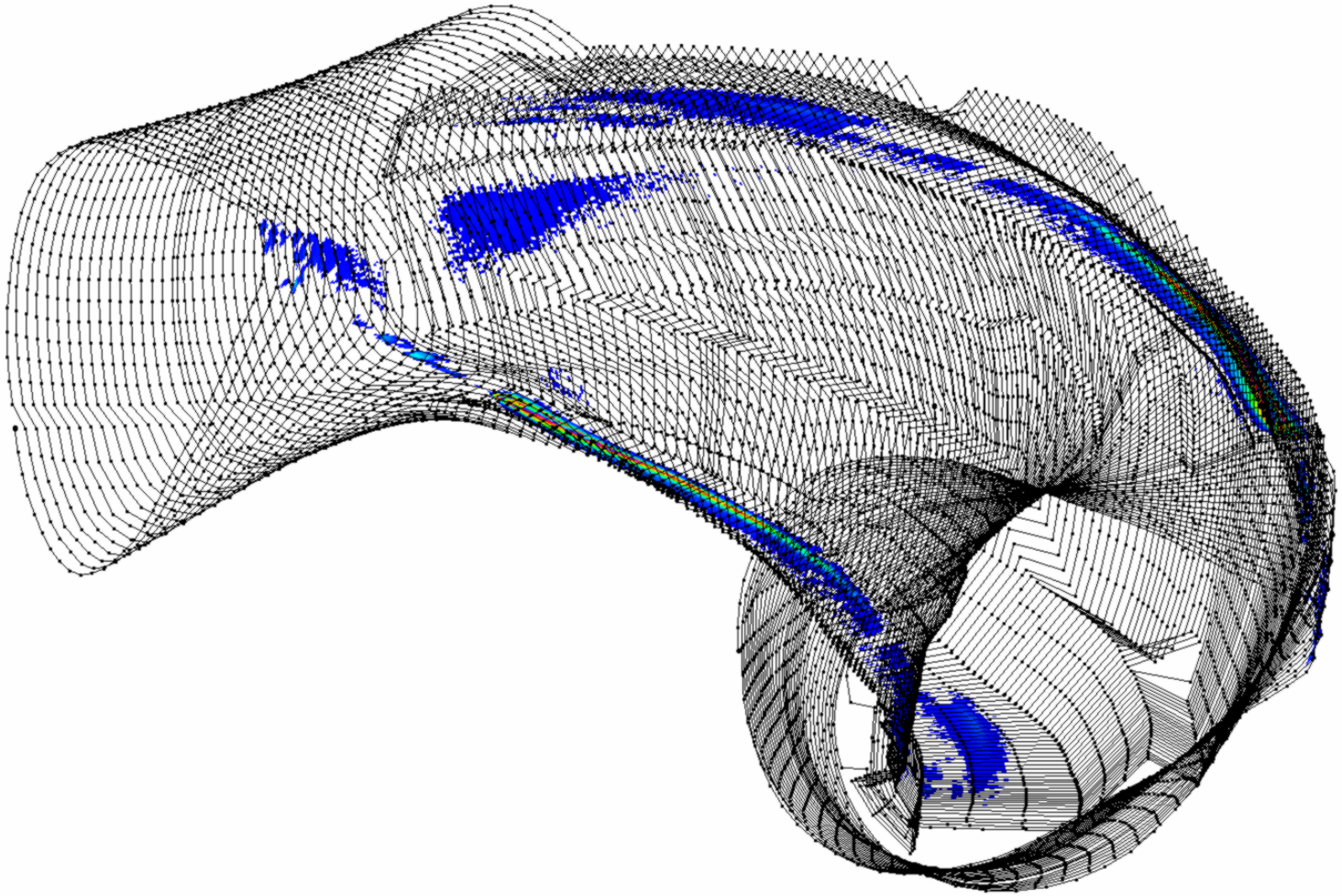
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 20 kA



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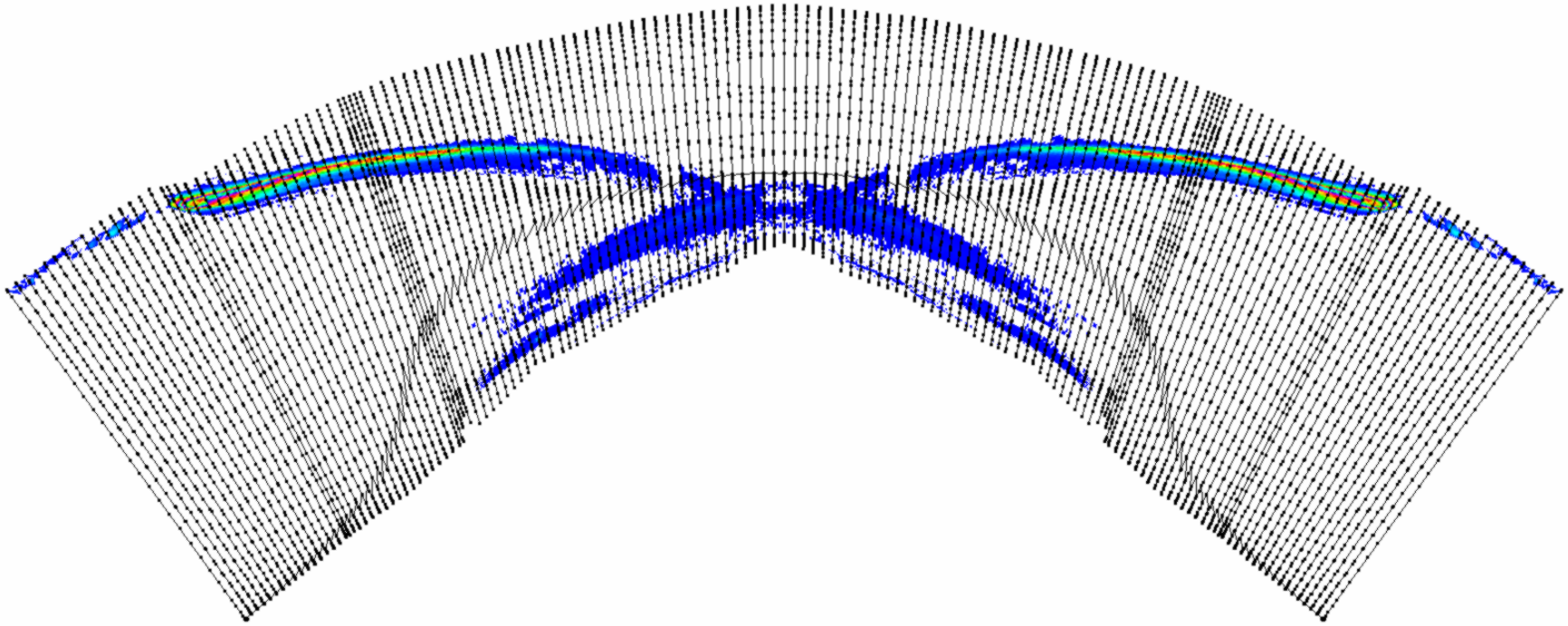
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = 20 kA



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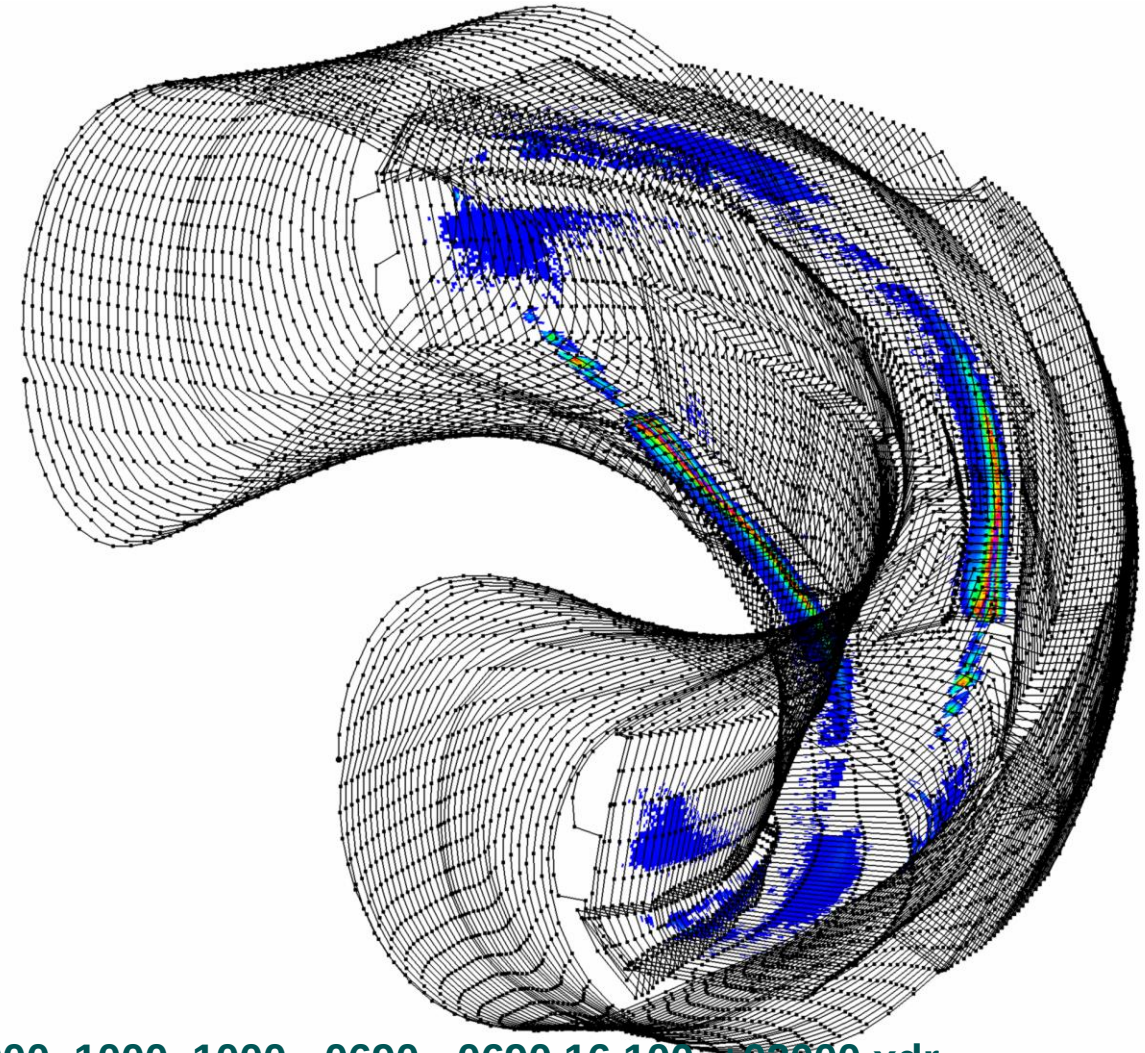
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 20 kA



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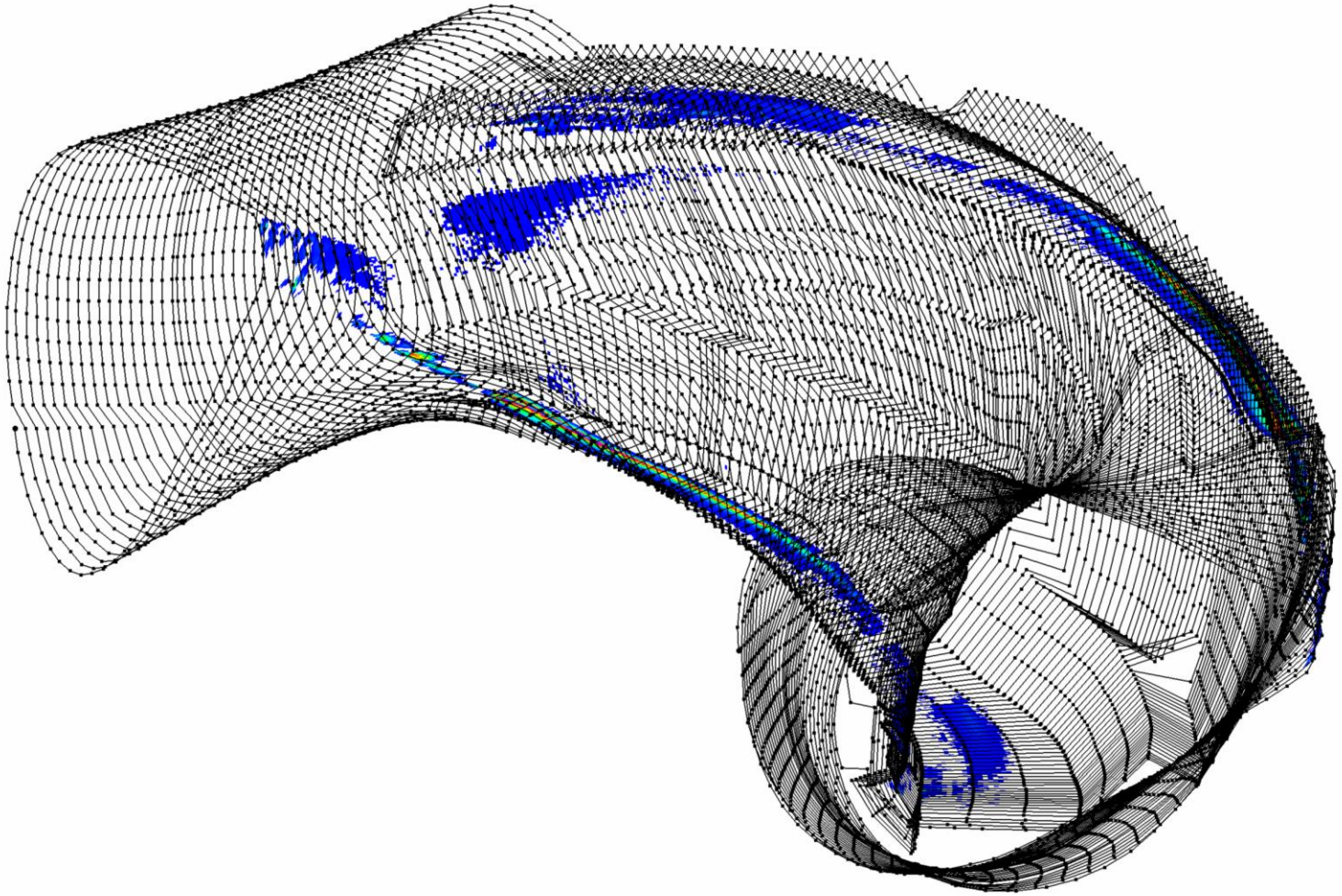
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 20 kA



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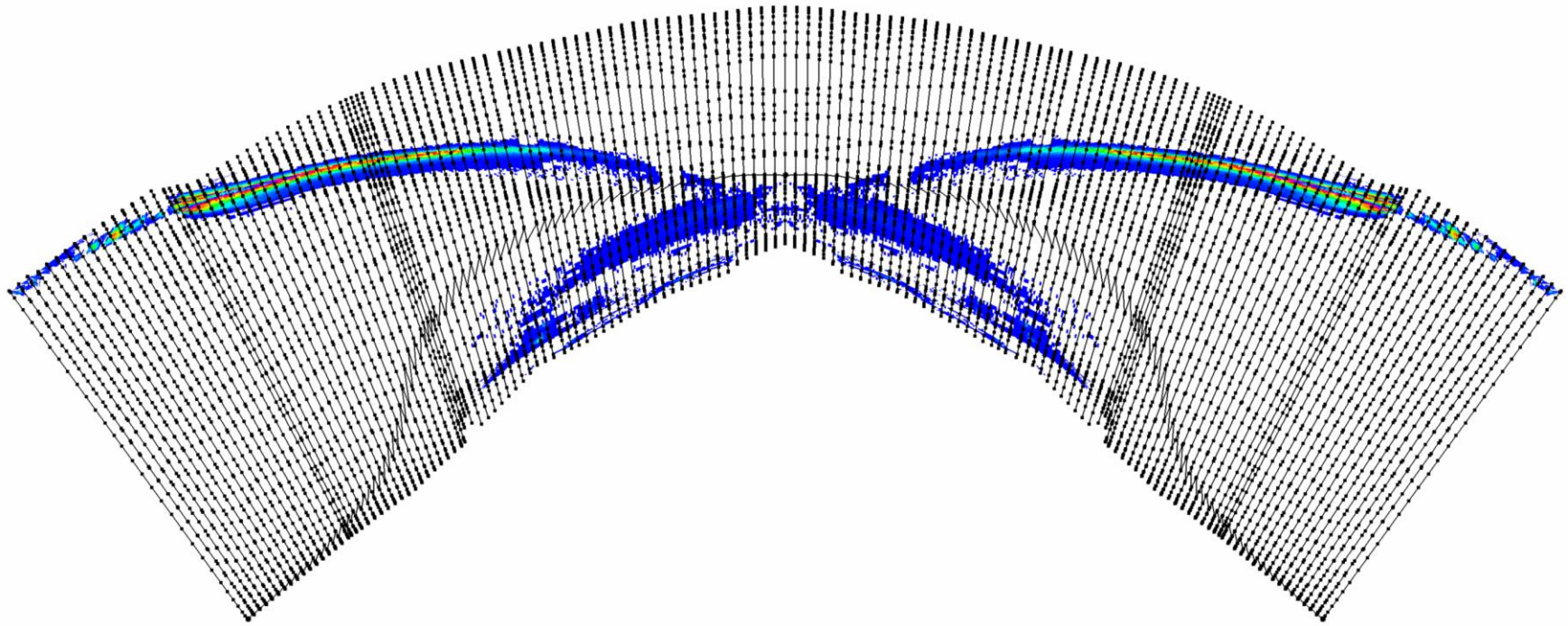
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = 20 kA



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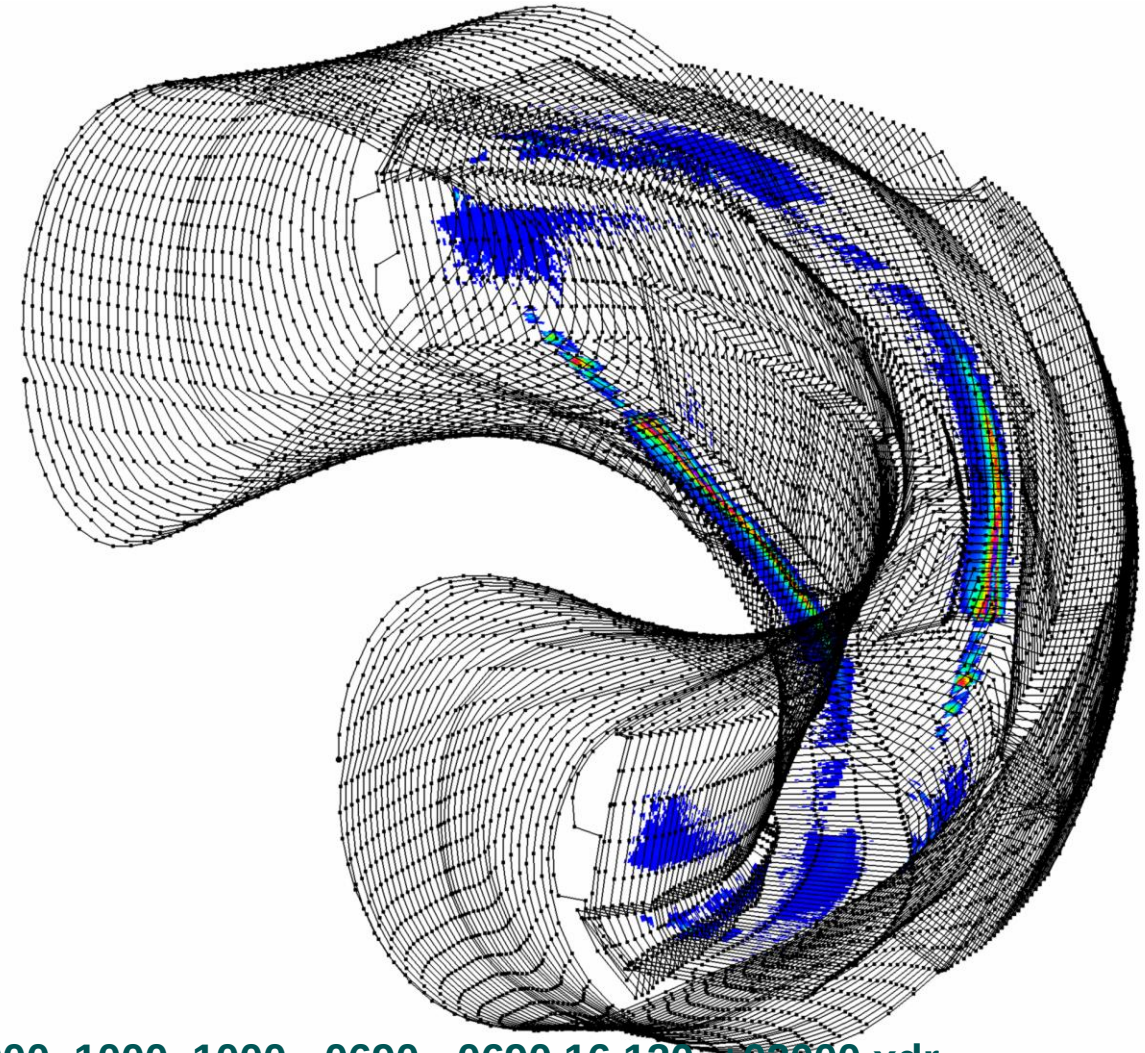
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 20 kA



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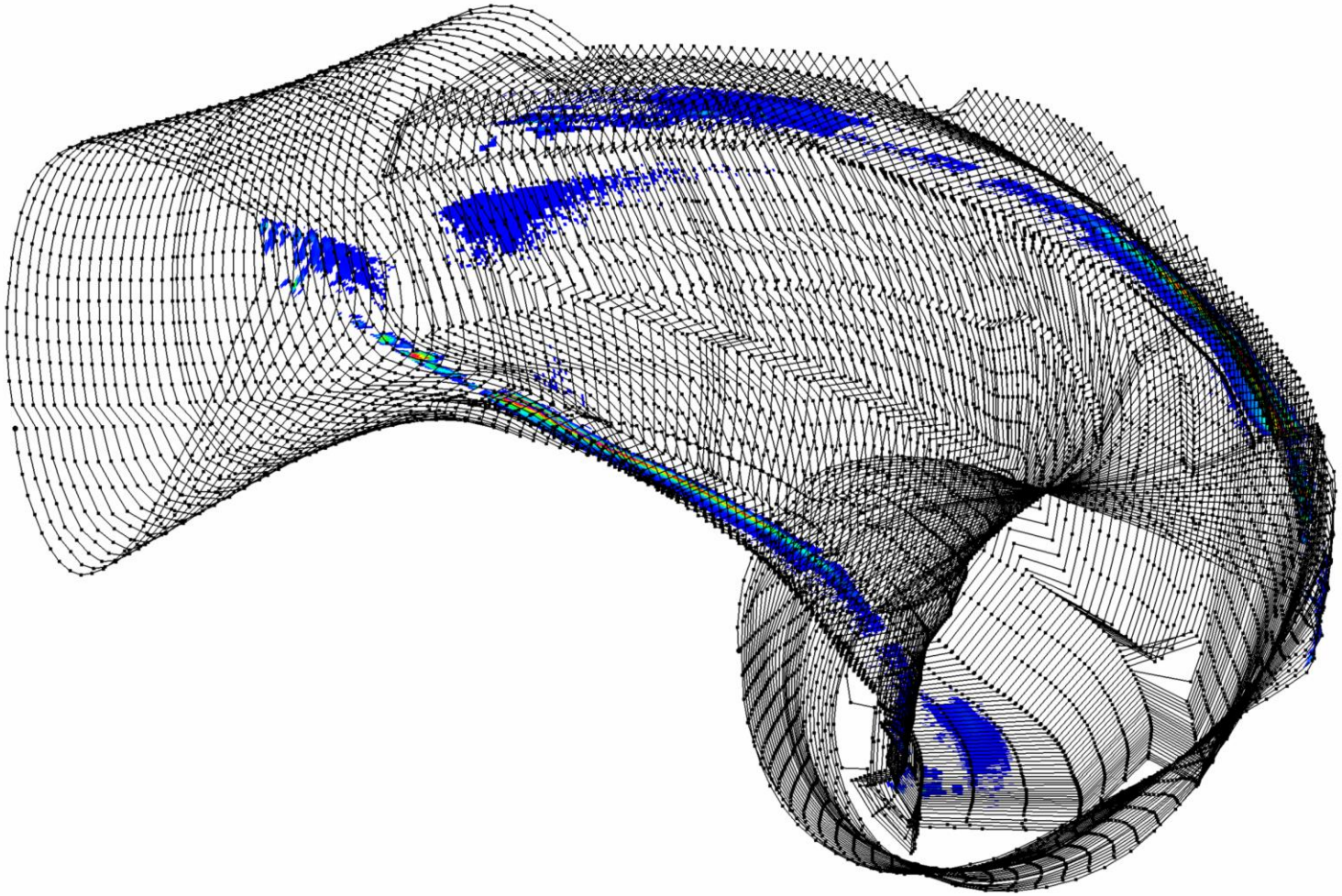
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 20 kA



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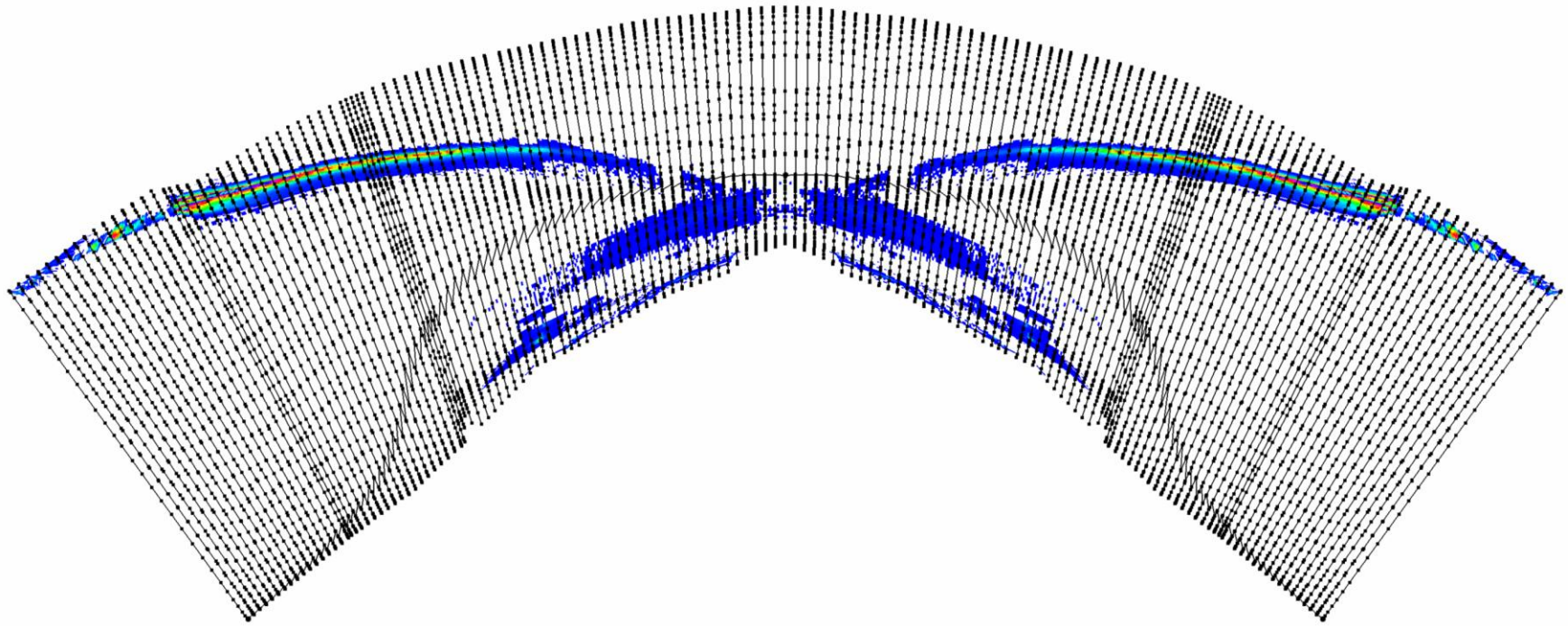
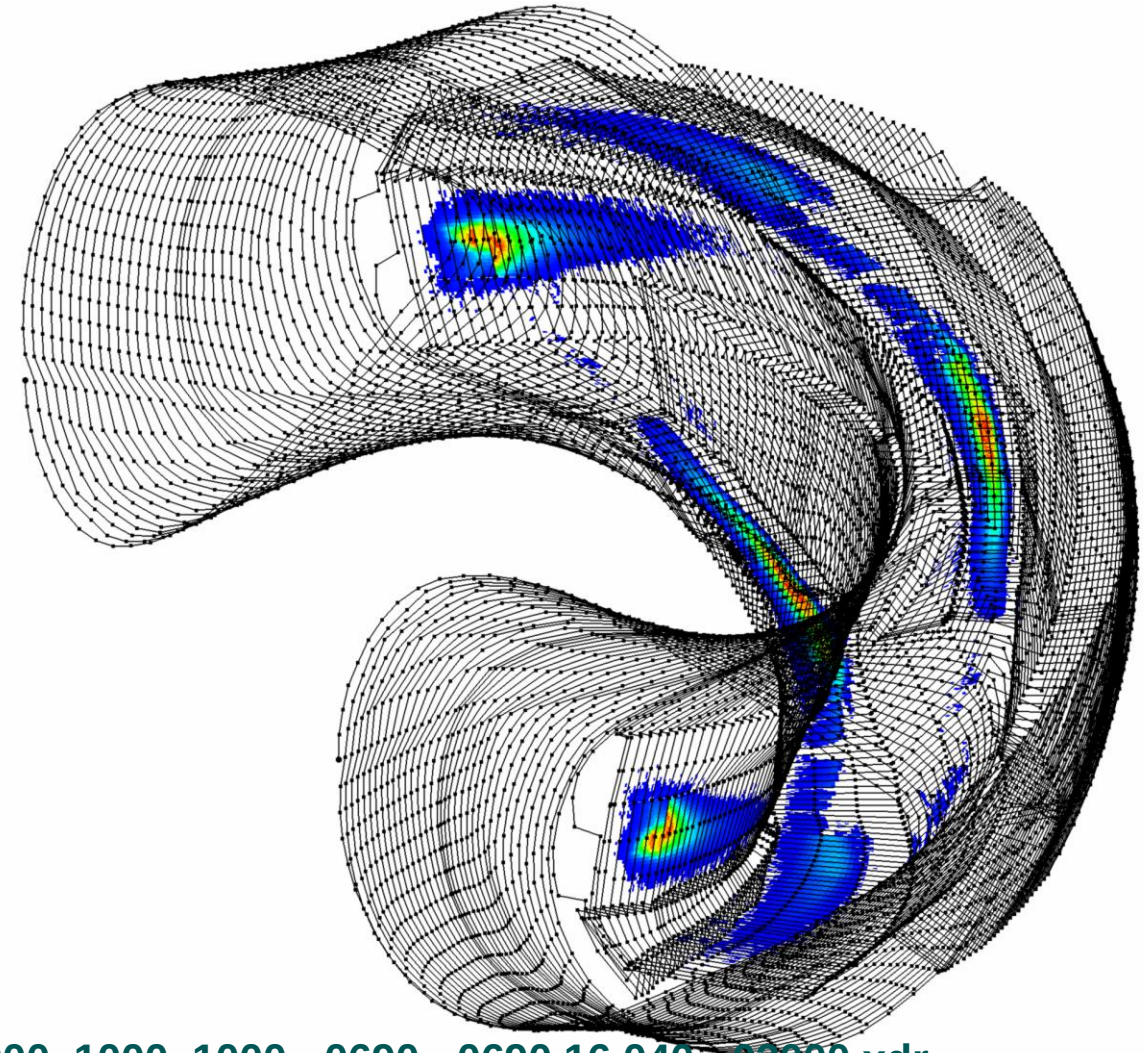
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = 20 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.120_+02000.xdr

Originalgeometrie, High Iota, Beta = 0,8 %, Itor = -20 kA



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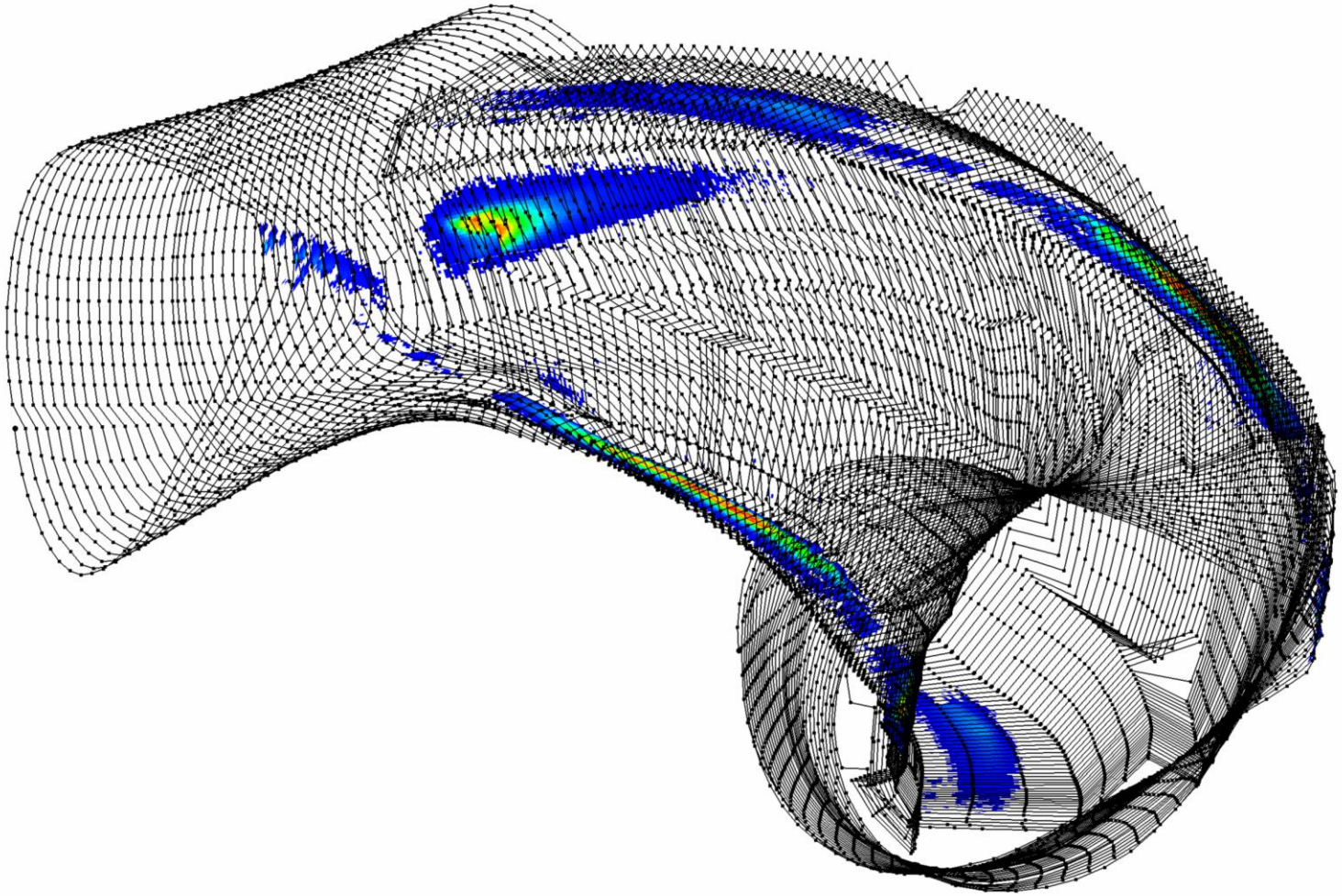
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = -20 kA



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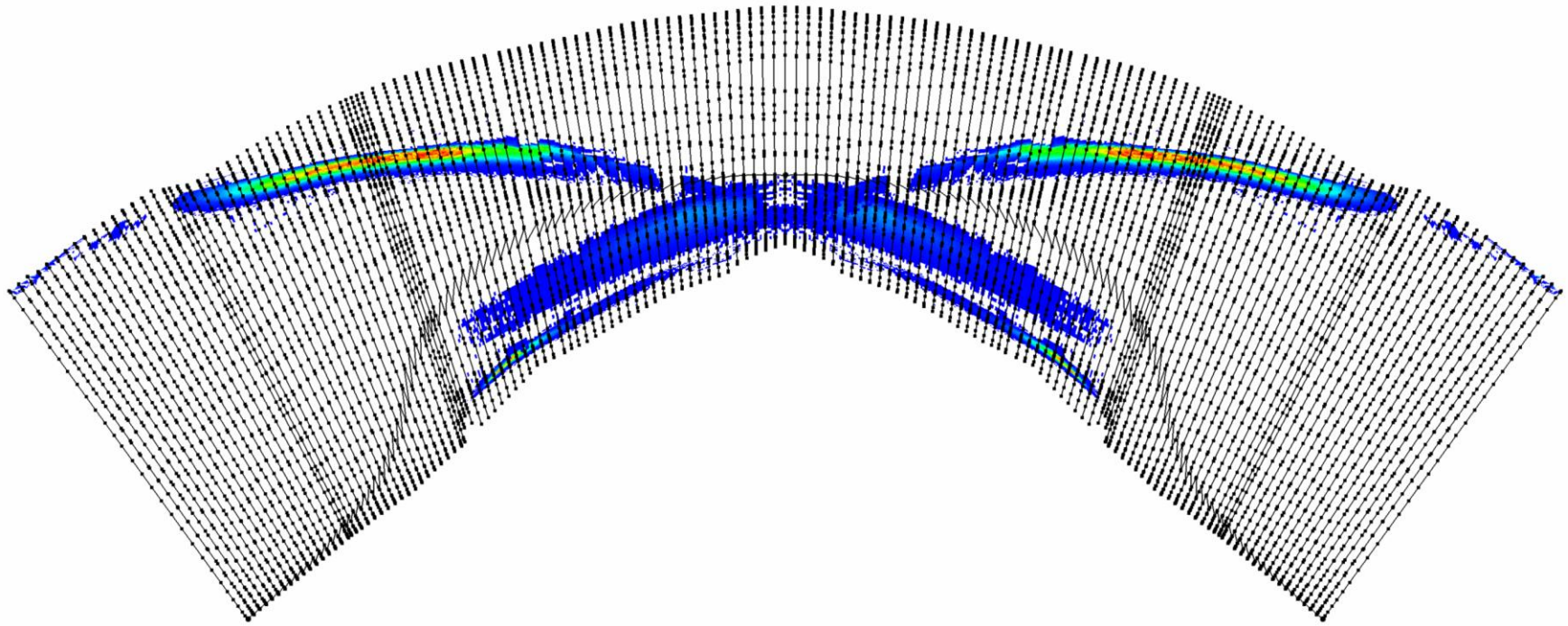
Originalgeometrie, High Iota, Beta = 0,8 %, Itor = -20 kA



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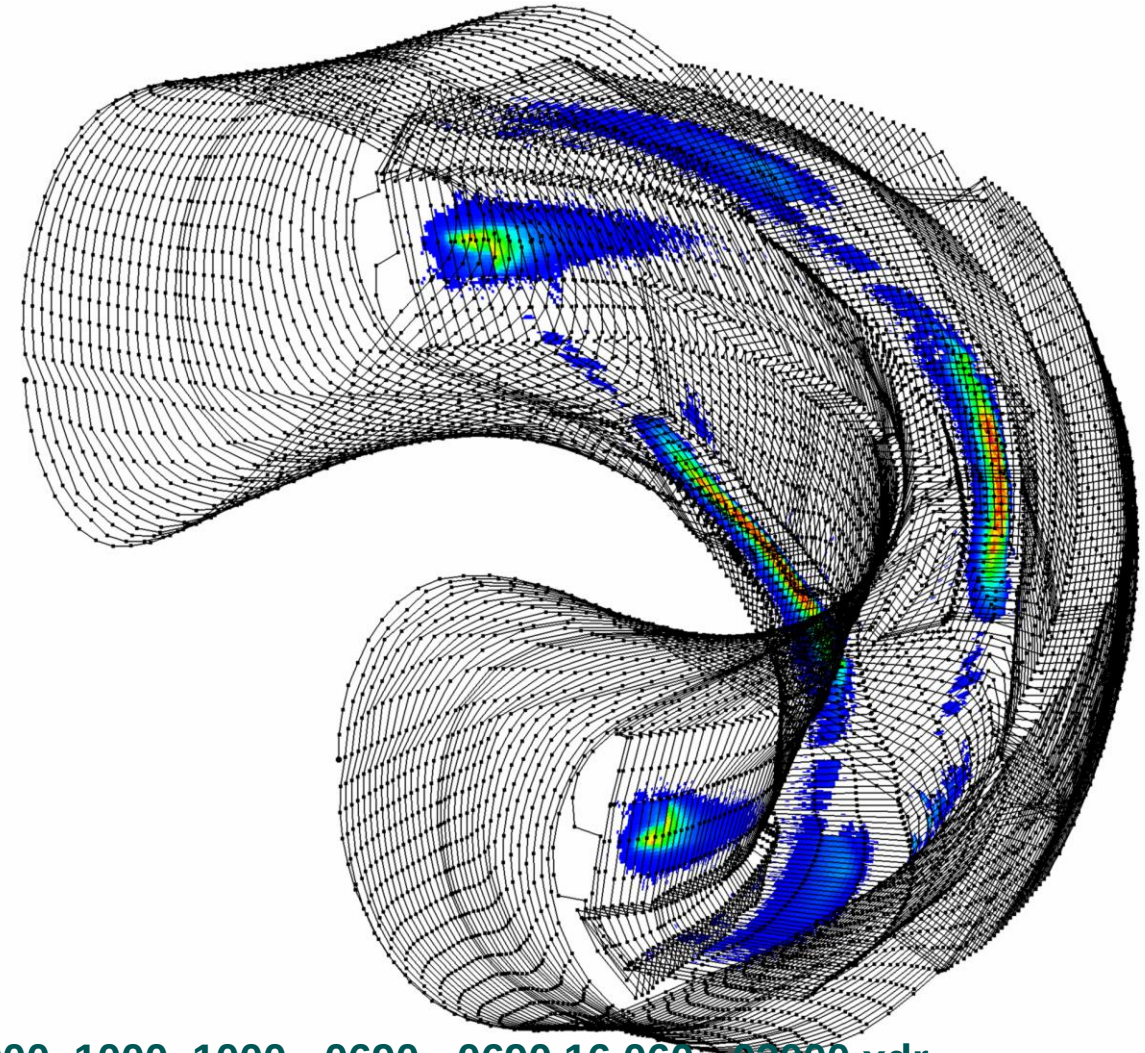
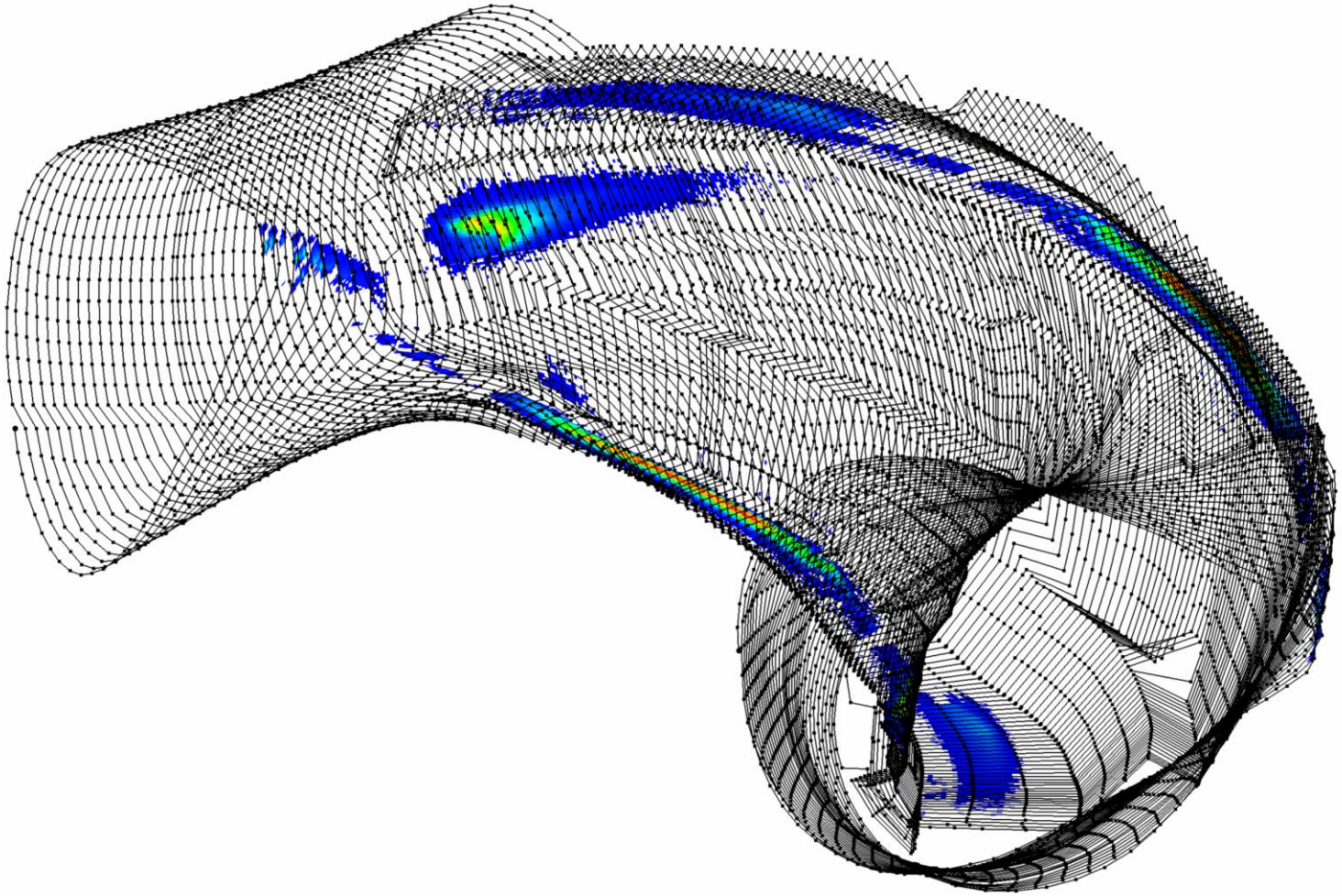
Originalgeometrie, High Iota, Beta = 1,2 %, Itor = -20 kA



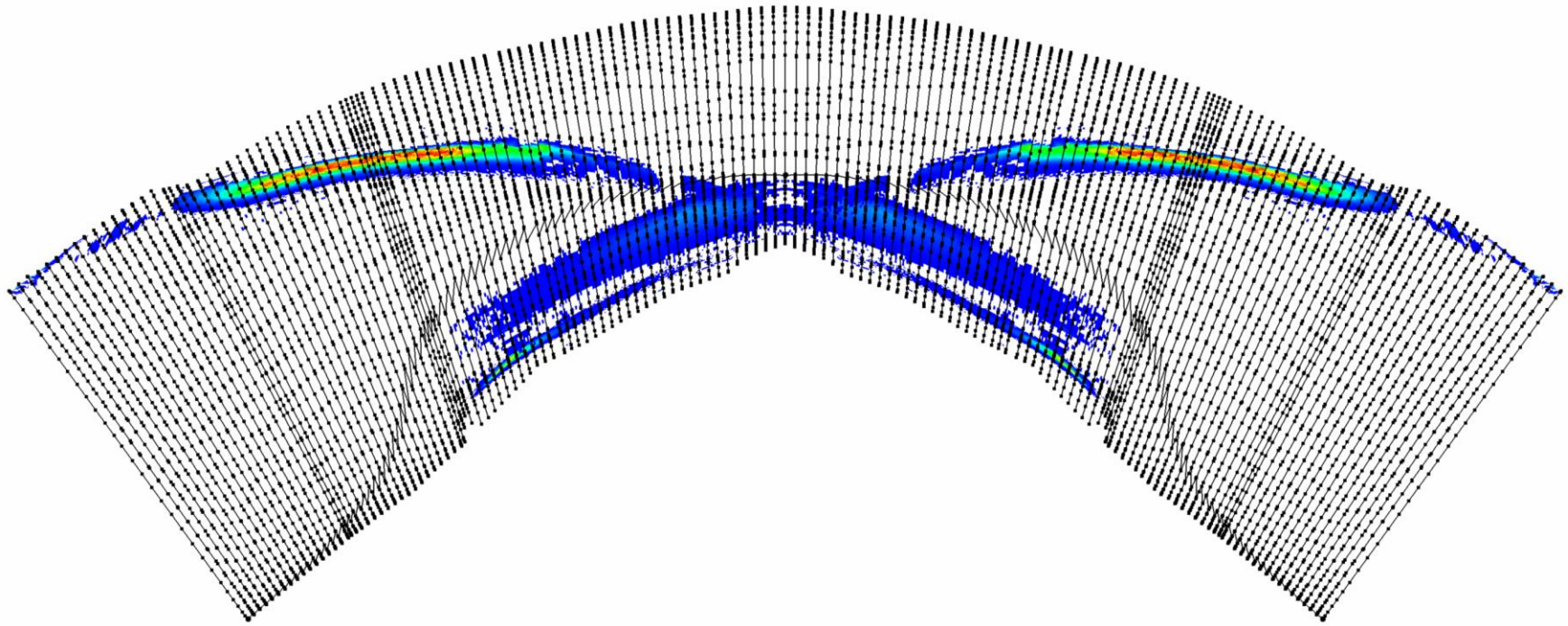
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_-02000.xdr

Originalgeometrie, High Iota, Beta = 1,2 %, Itor = -20 kA



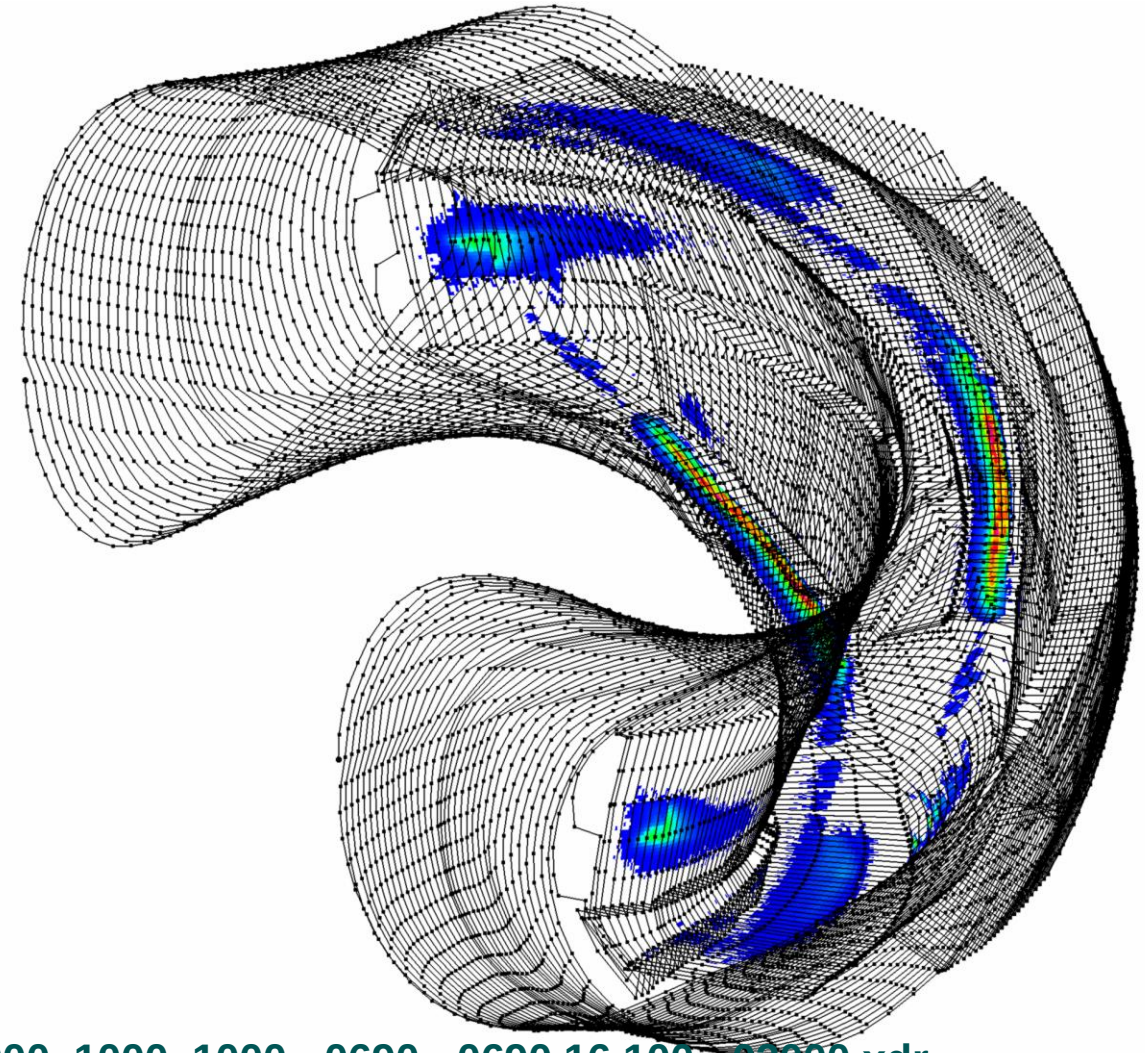
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_-02000.xdr

Originalgeometrie, High Iota, Beta = 1,2 %, Itor = -20 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.060_-02000.xdr

Originalgeometrie, High Iota, Beta = 2,0 %, Itor = -20 kA



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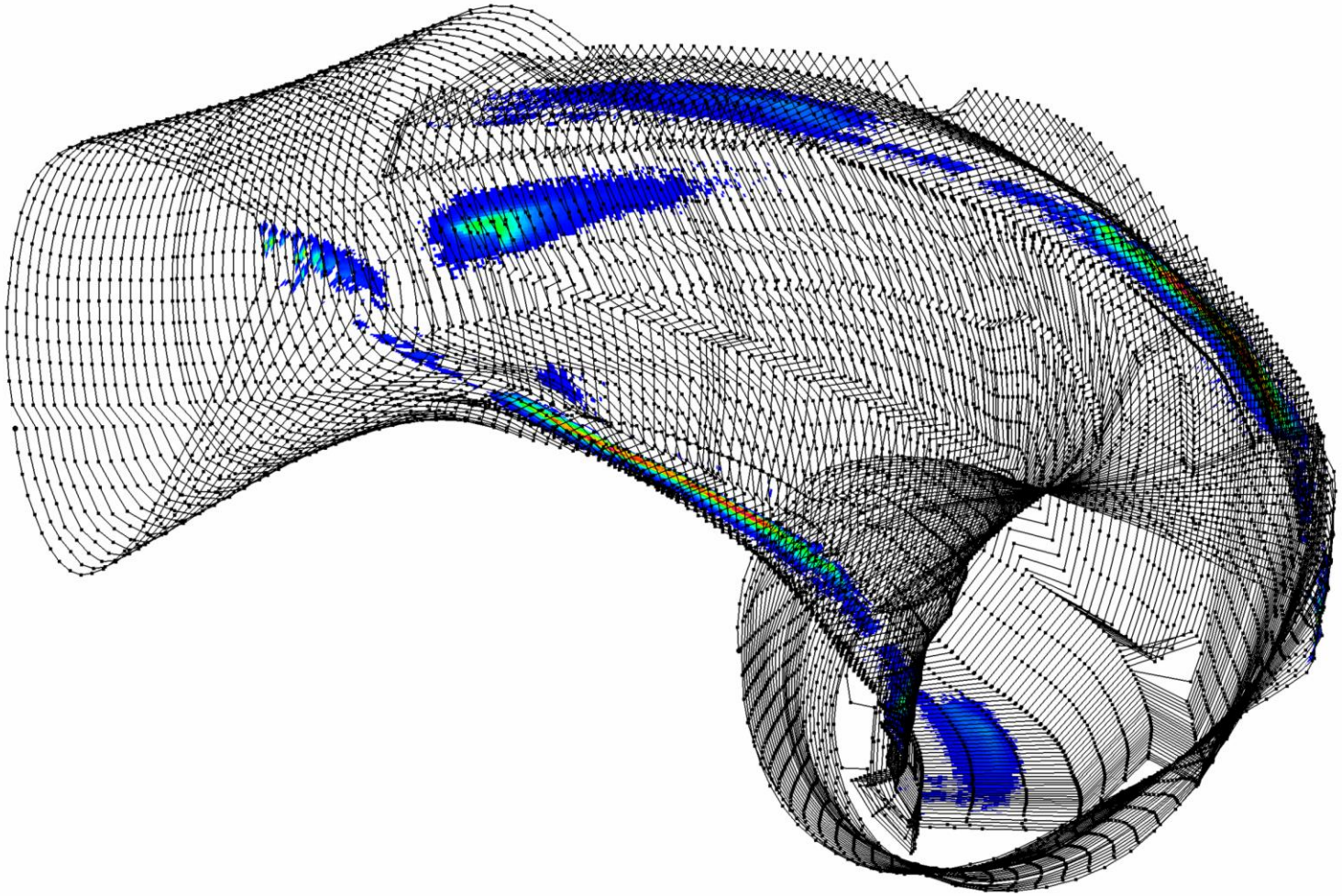
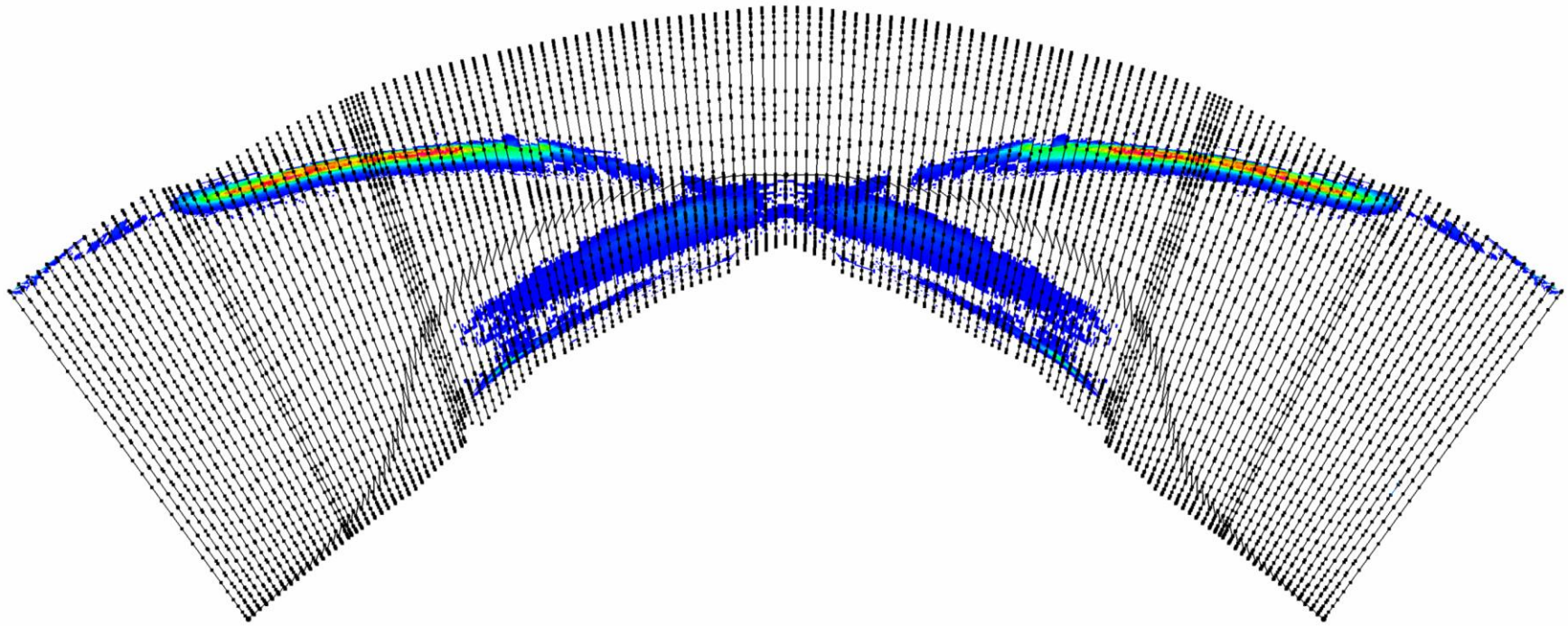
Originalgeometrie, High Iota, Beta = 2,0 %, Itor = -20 kA



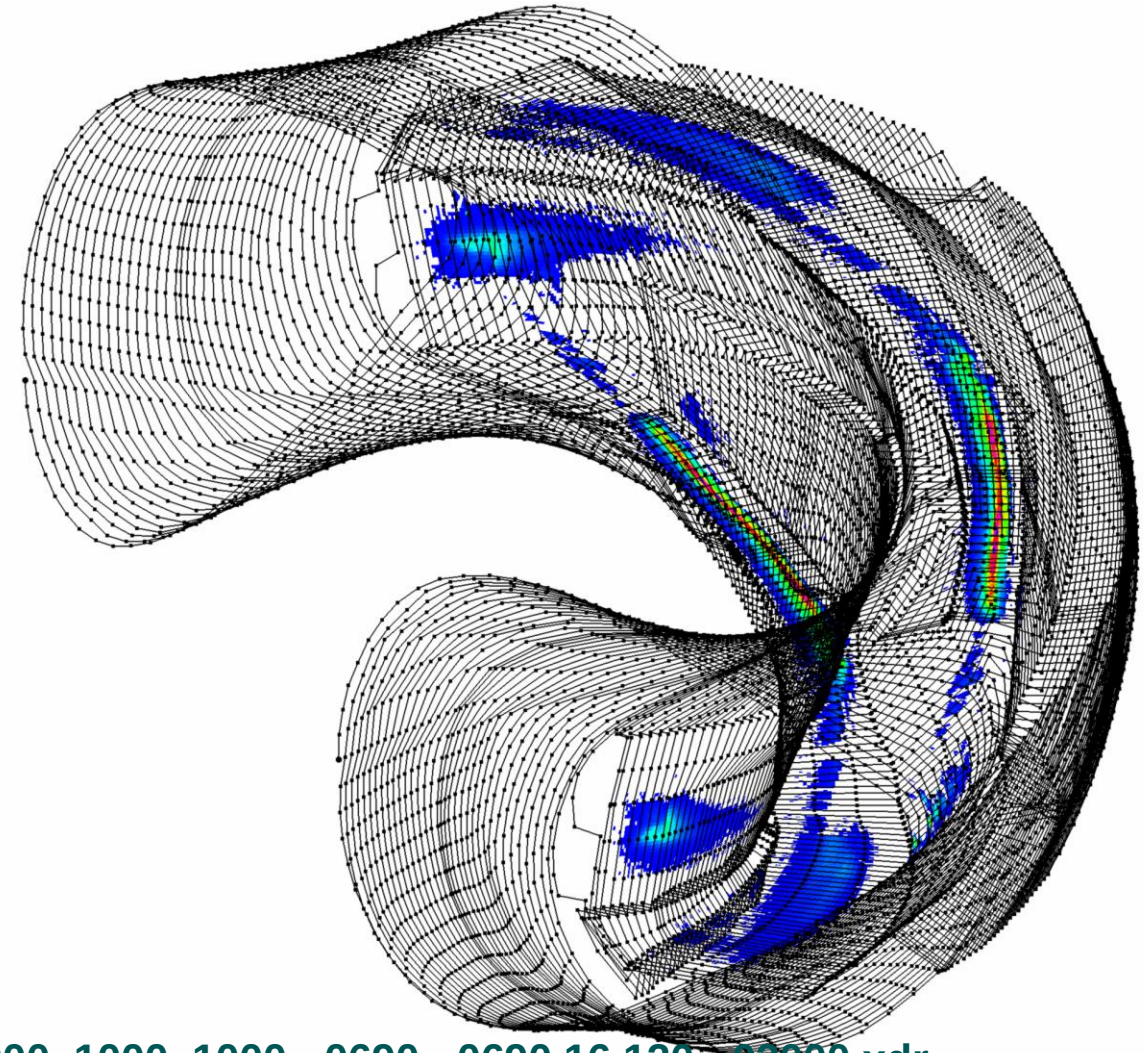
fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.100_-02000.xdr

Originalgeometrie, High Iota, Beta = 2,0 %, Itor = -20 kA



fieldn_altern181x181x96.w7x.1000_1000_1000_1000_-0690_-0690.16.100_-02000.xdr

Originalgeometrie, High Iota, Beta = 2,4 %, Itor = -20 kA



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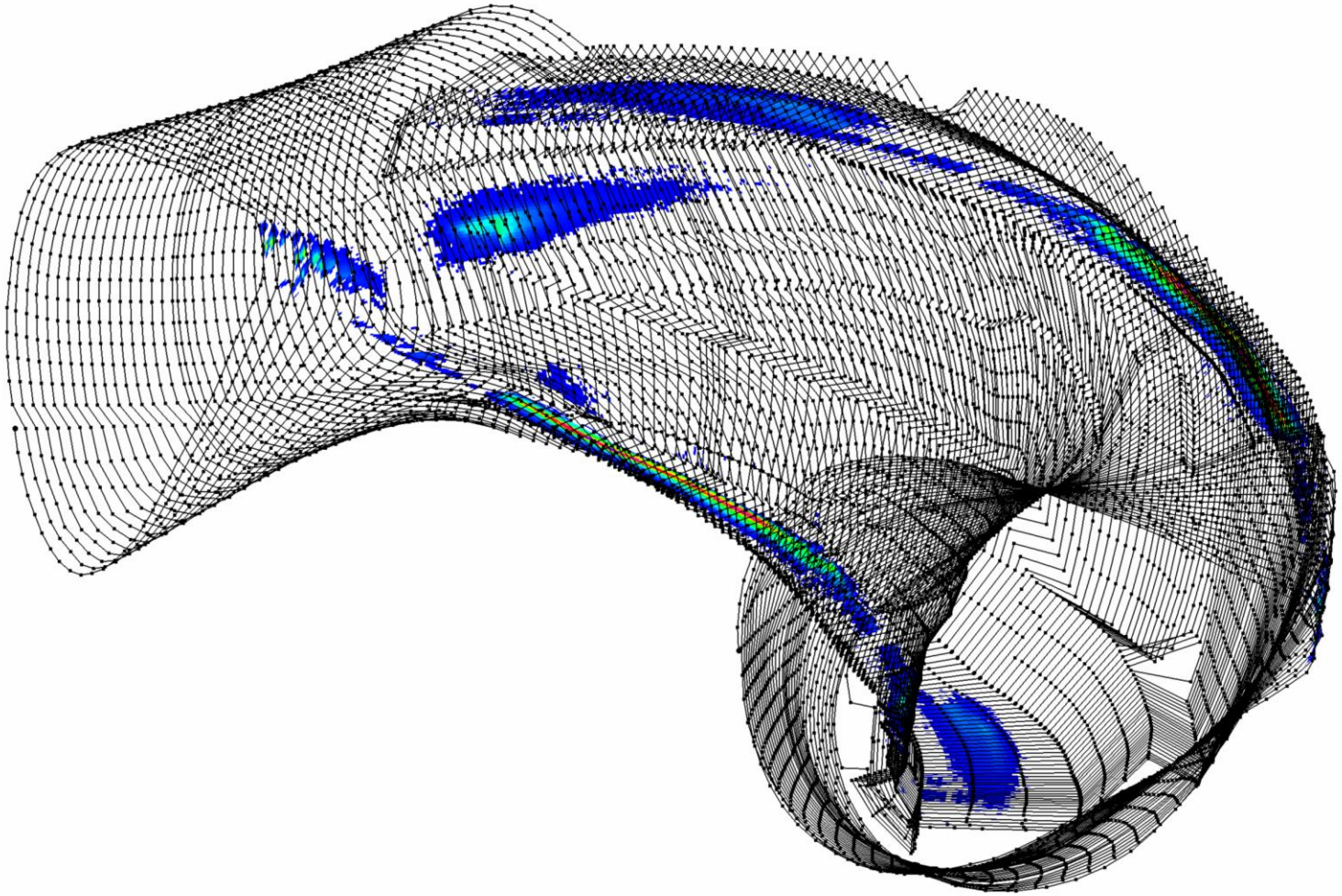
Originalgeometrie, High Iota, Beta = 2,4 %, Itor = -20 kA



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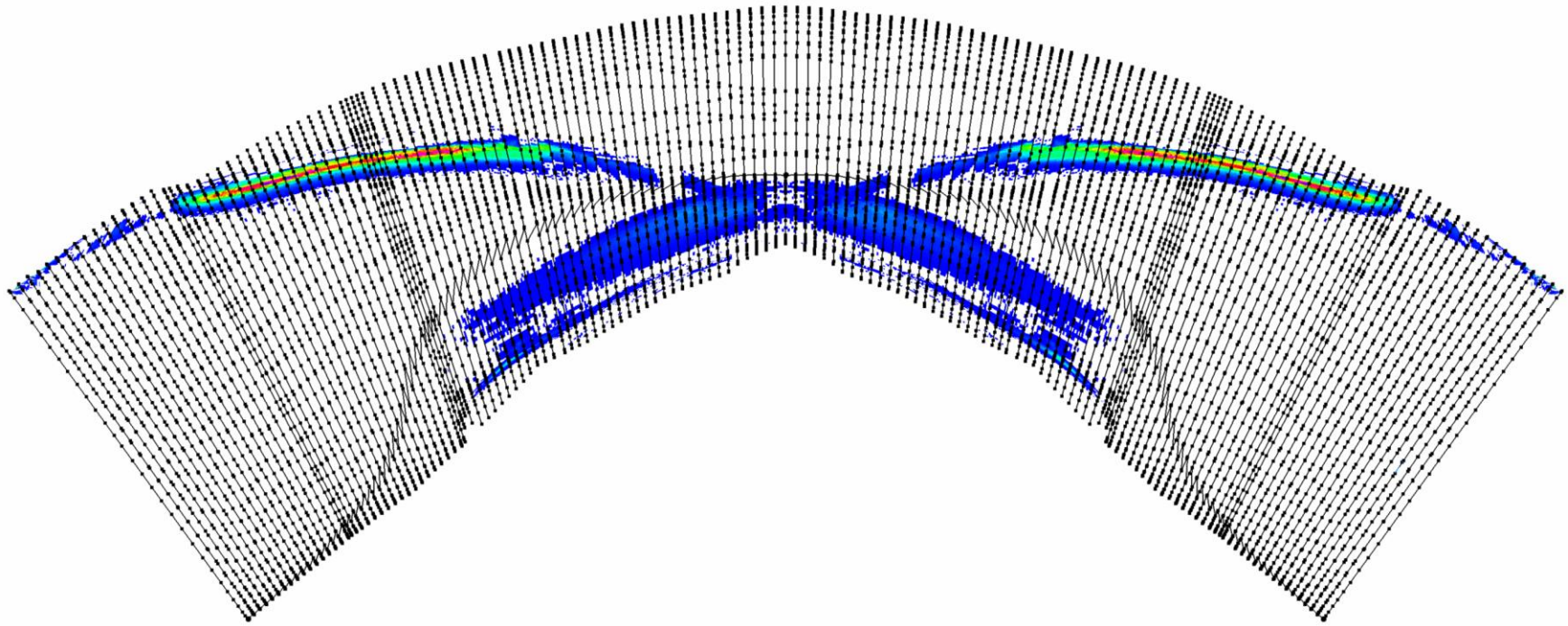

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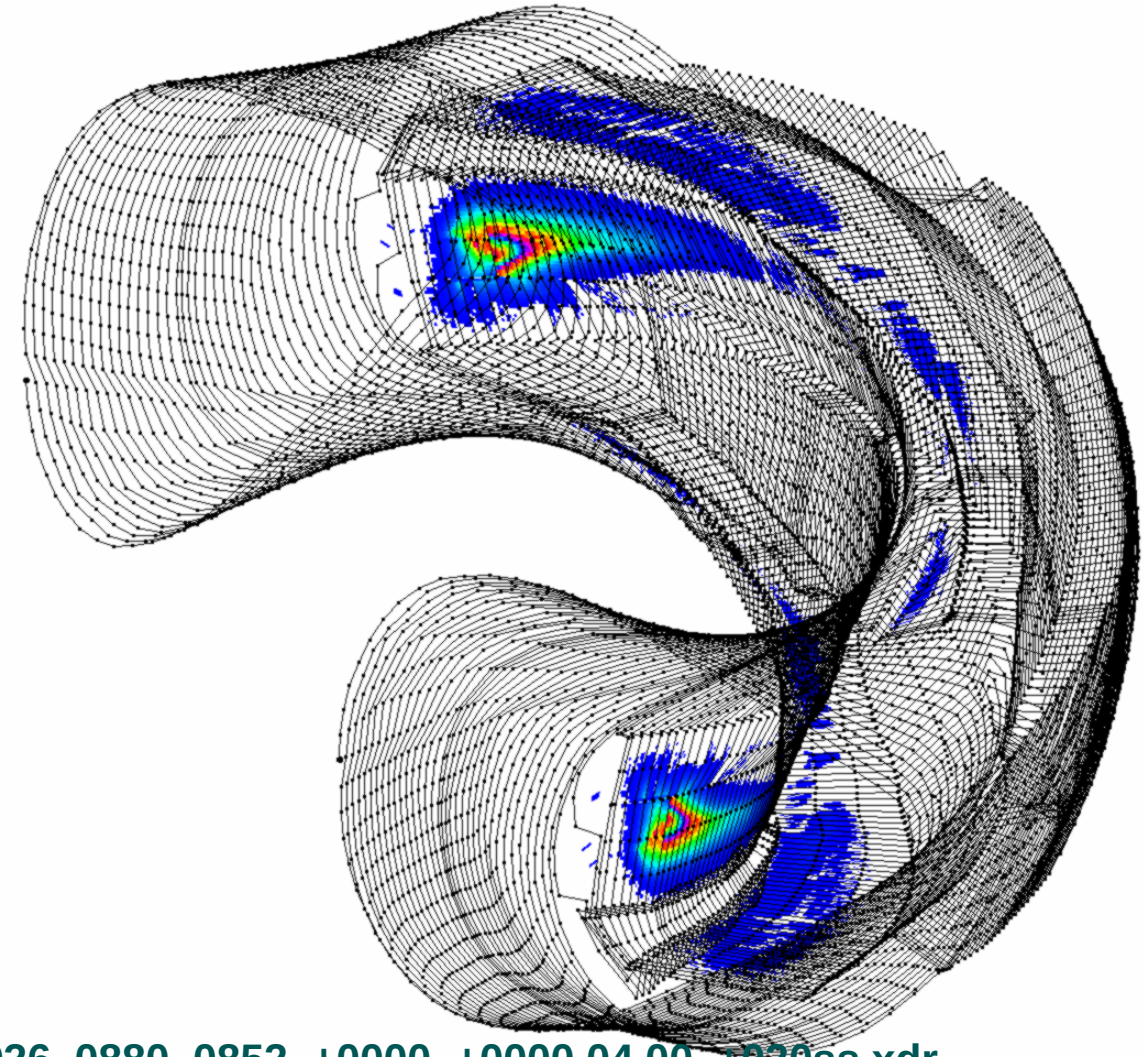

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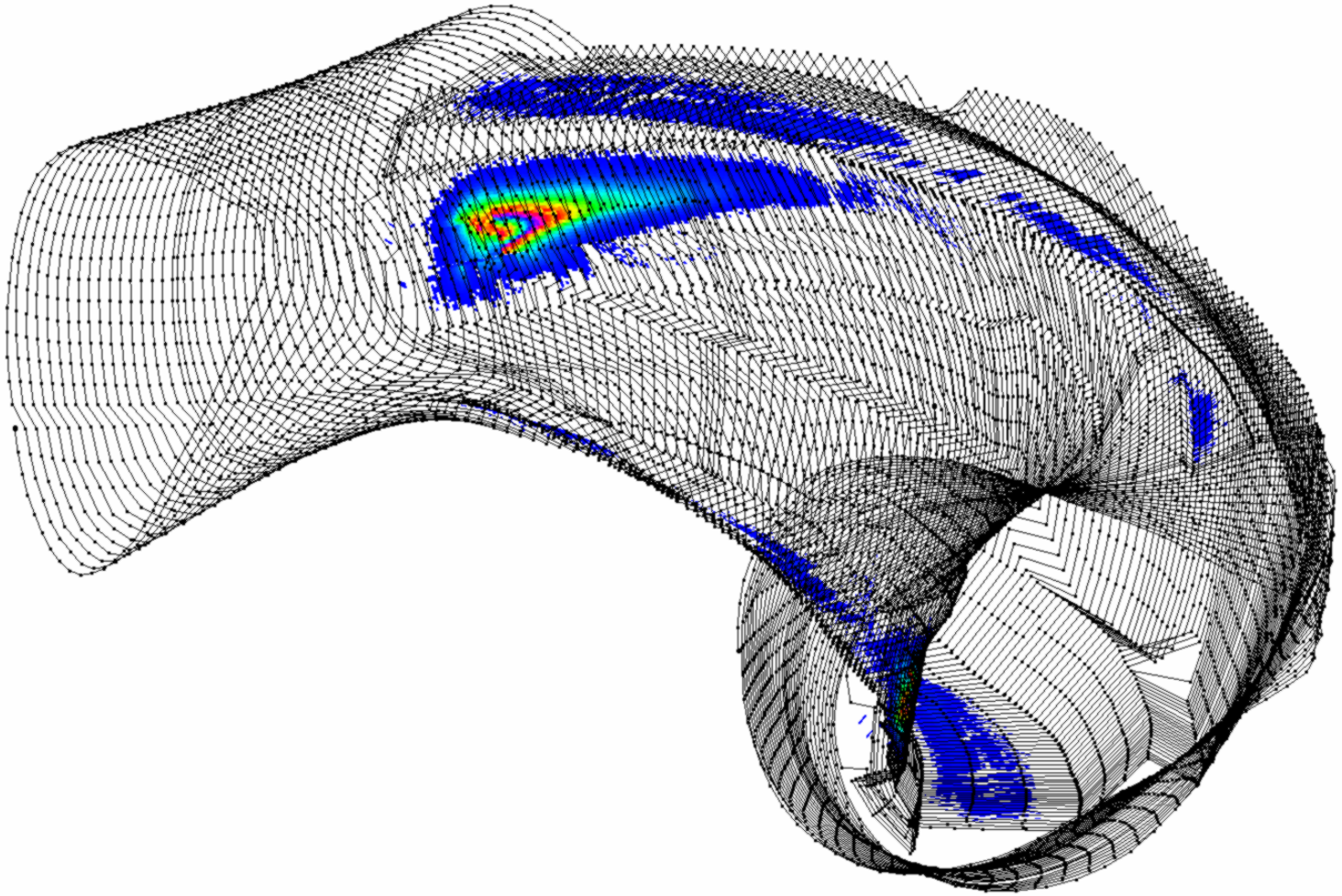
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 20 kA



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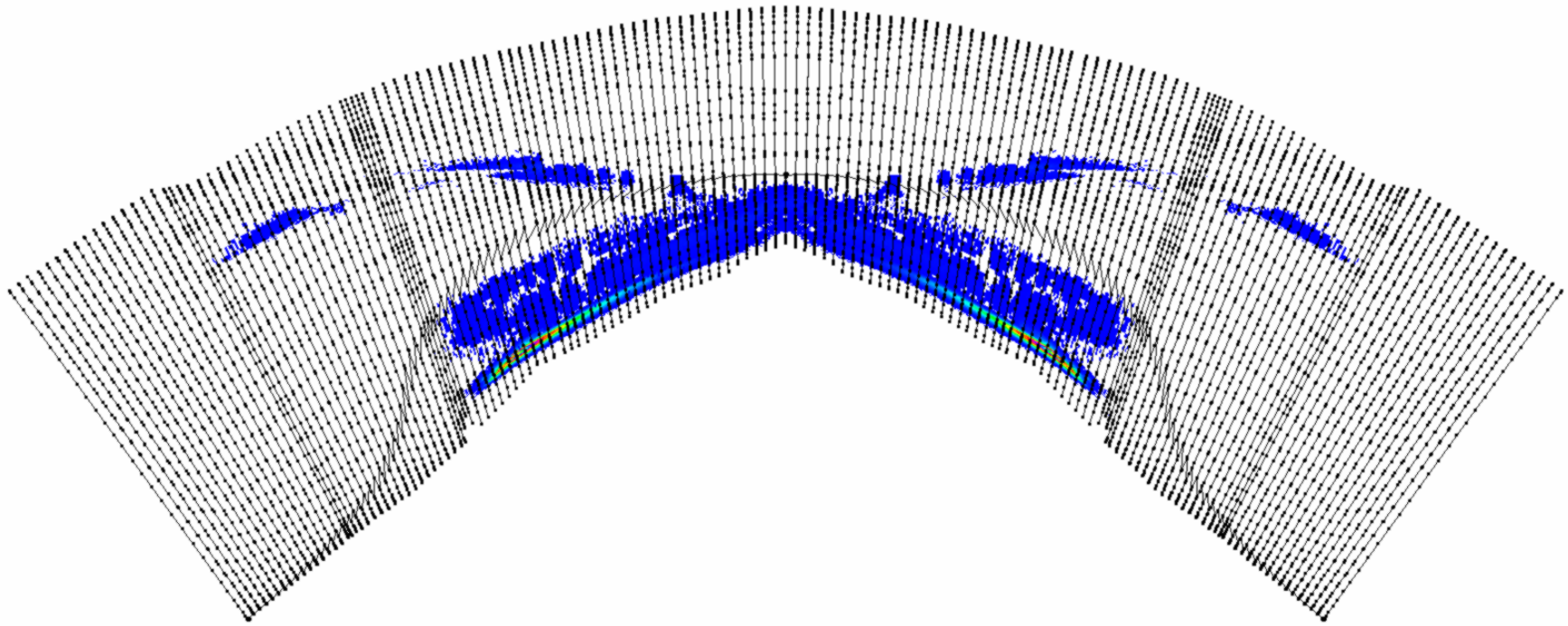
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = 20 kA



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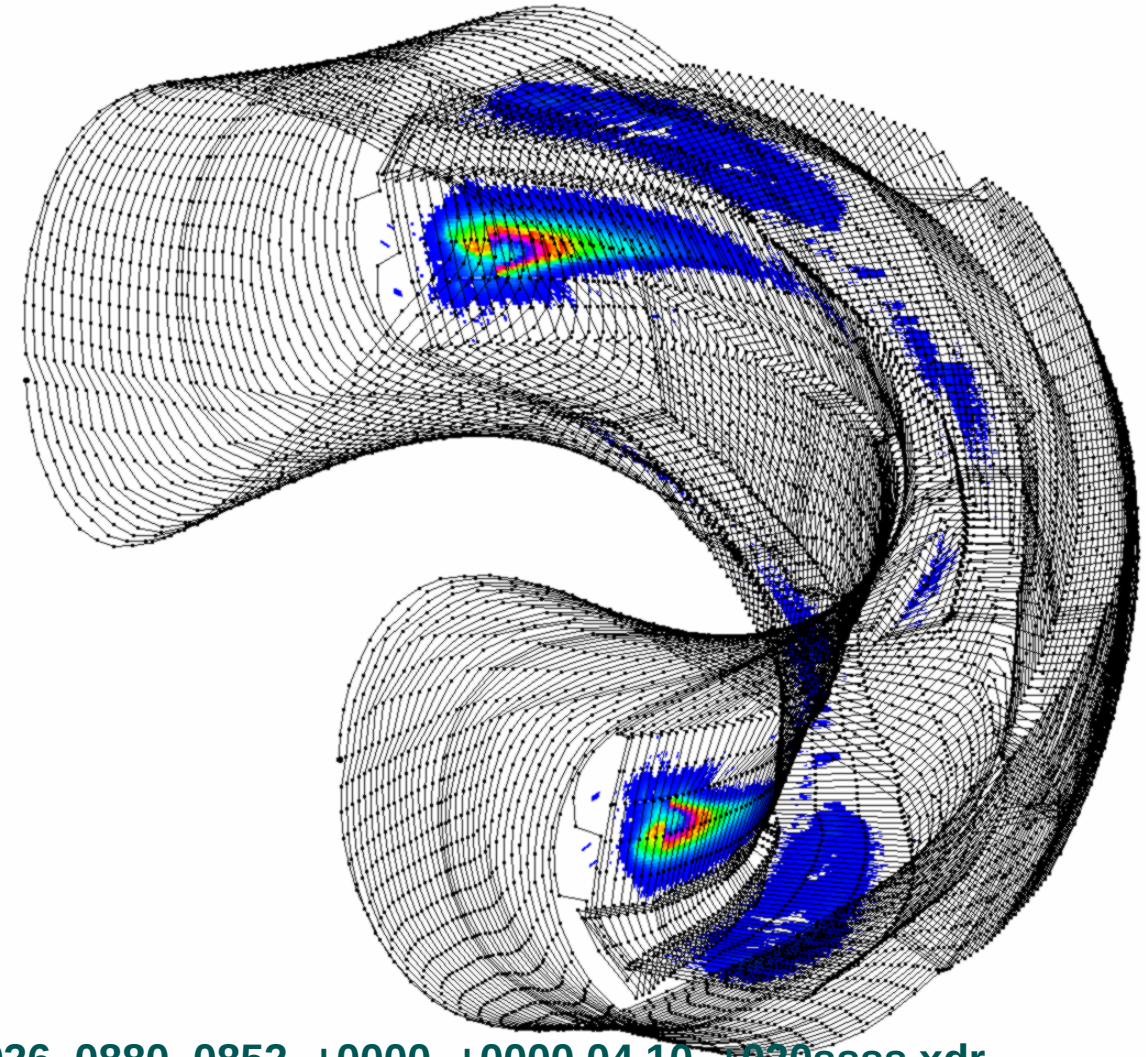

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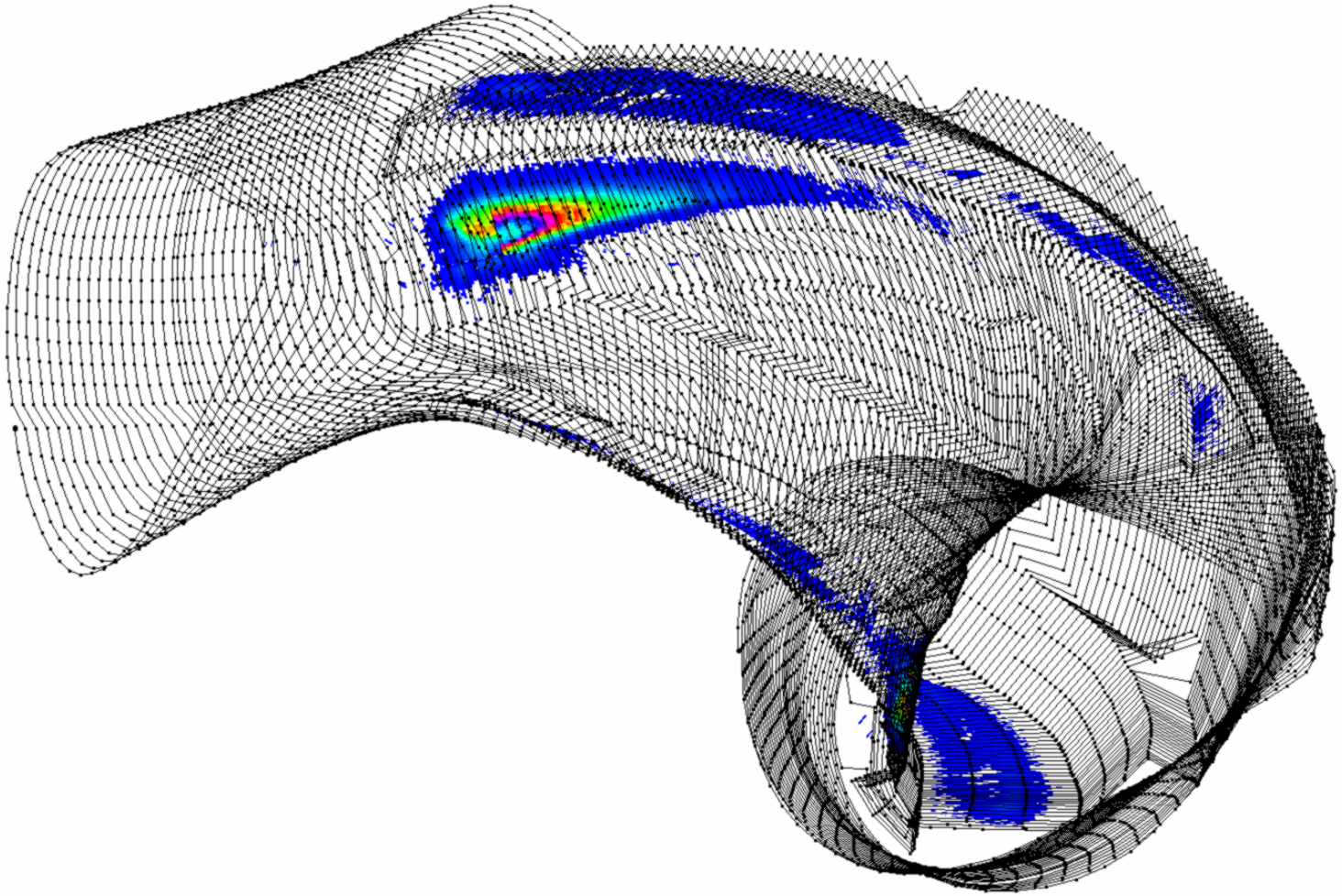

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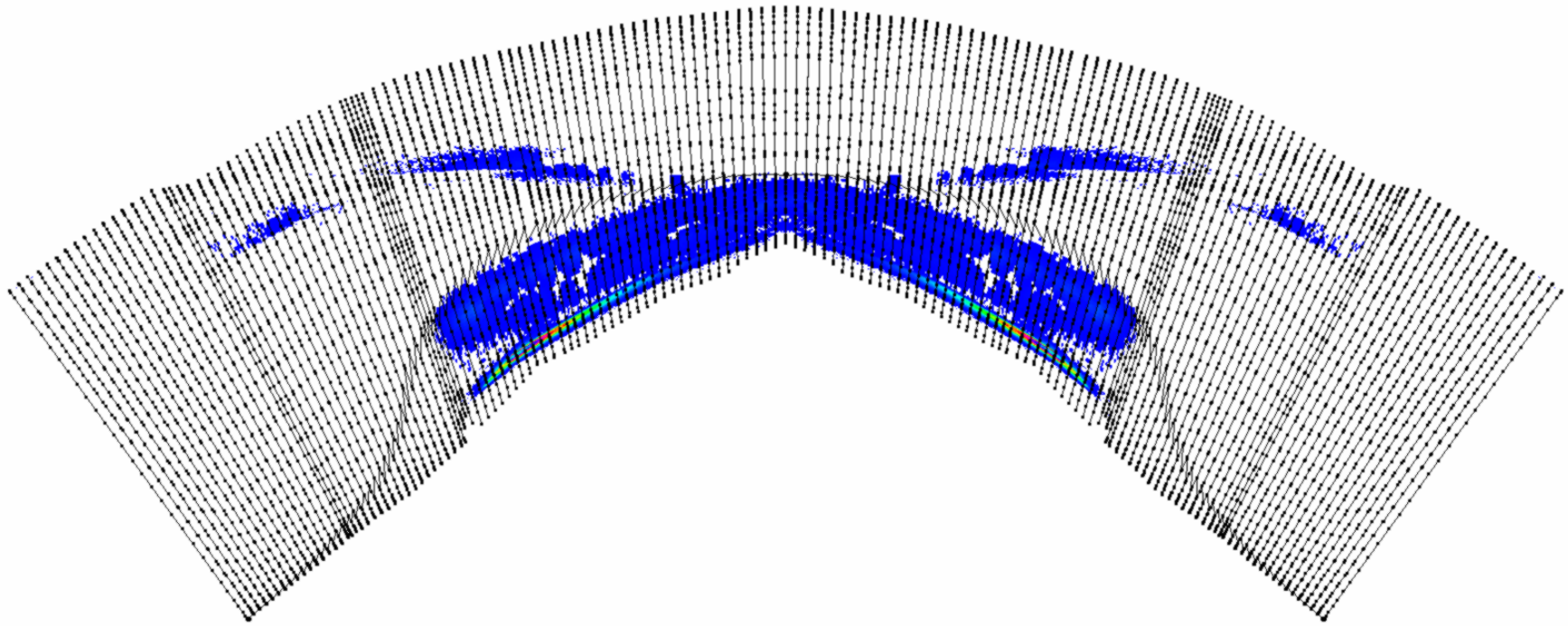

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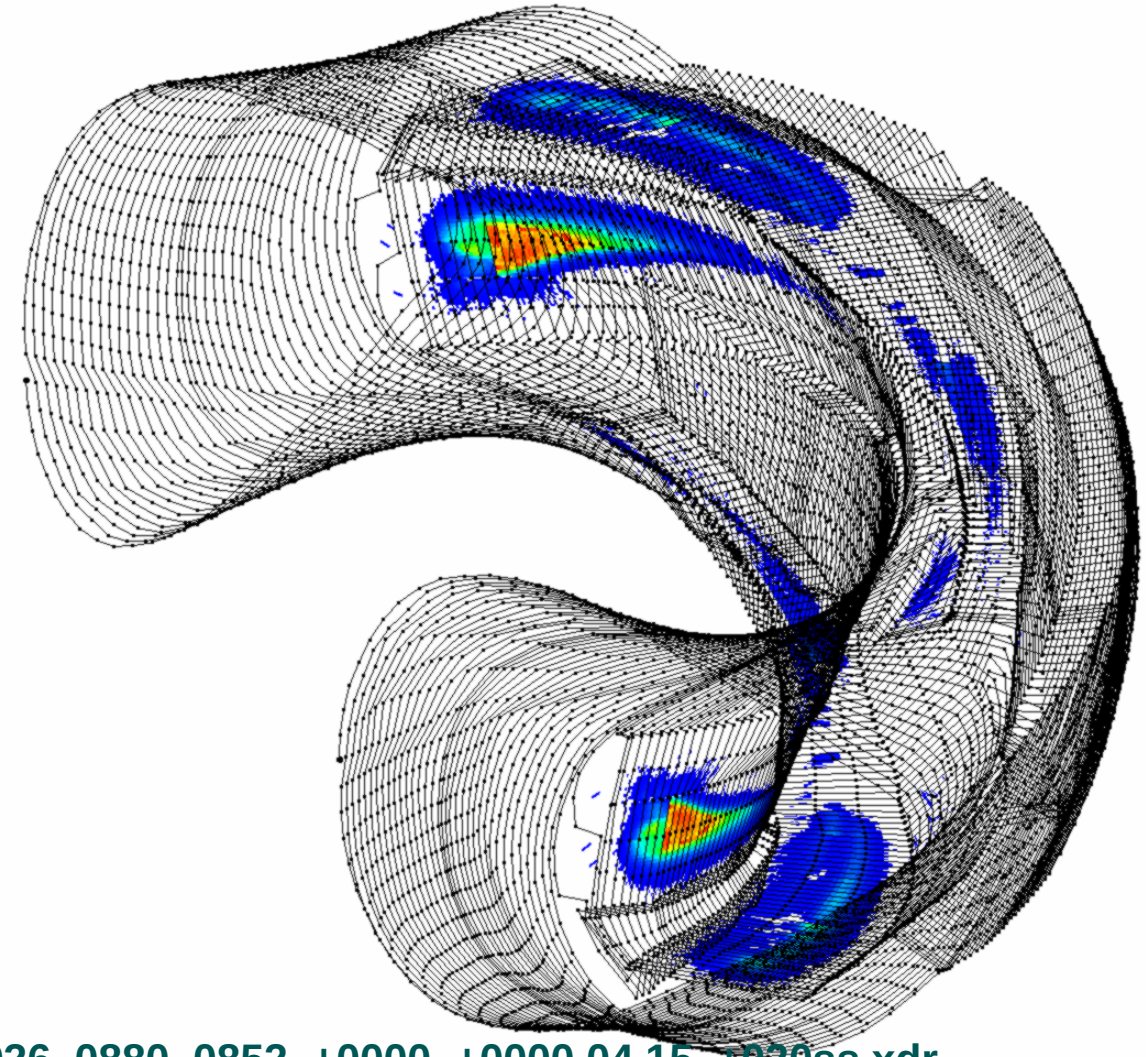
Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 20 kA



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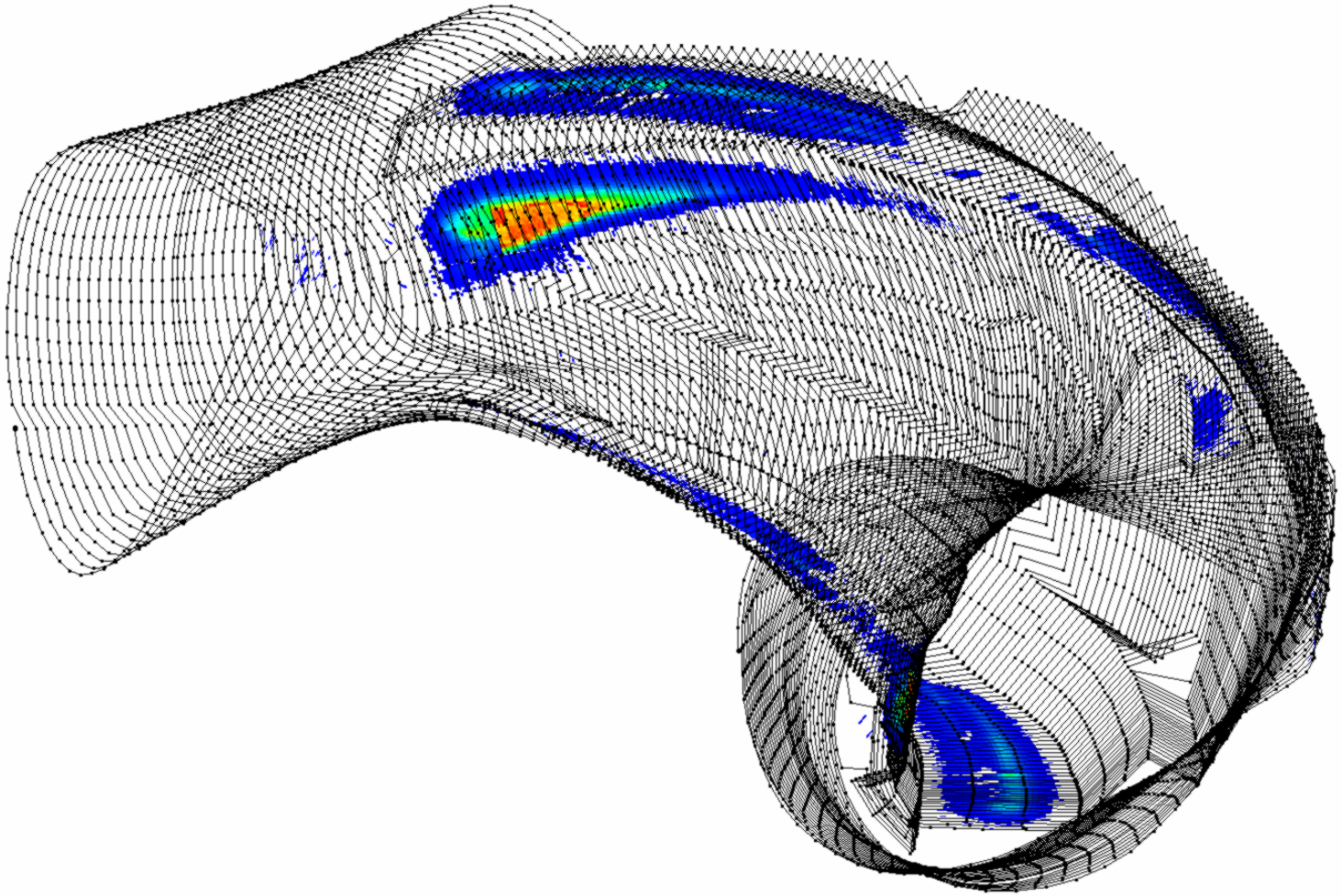

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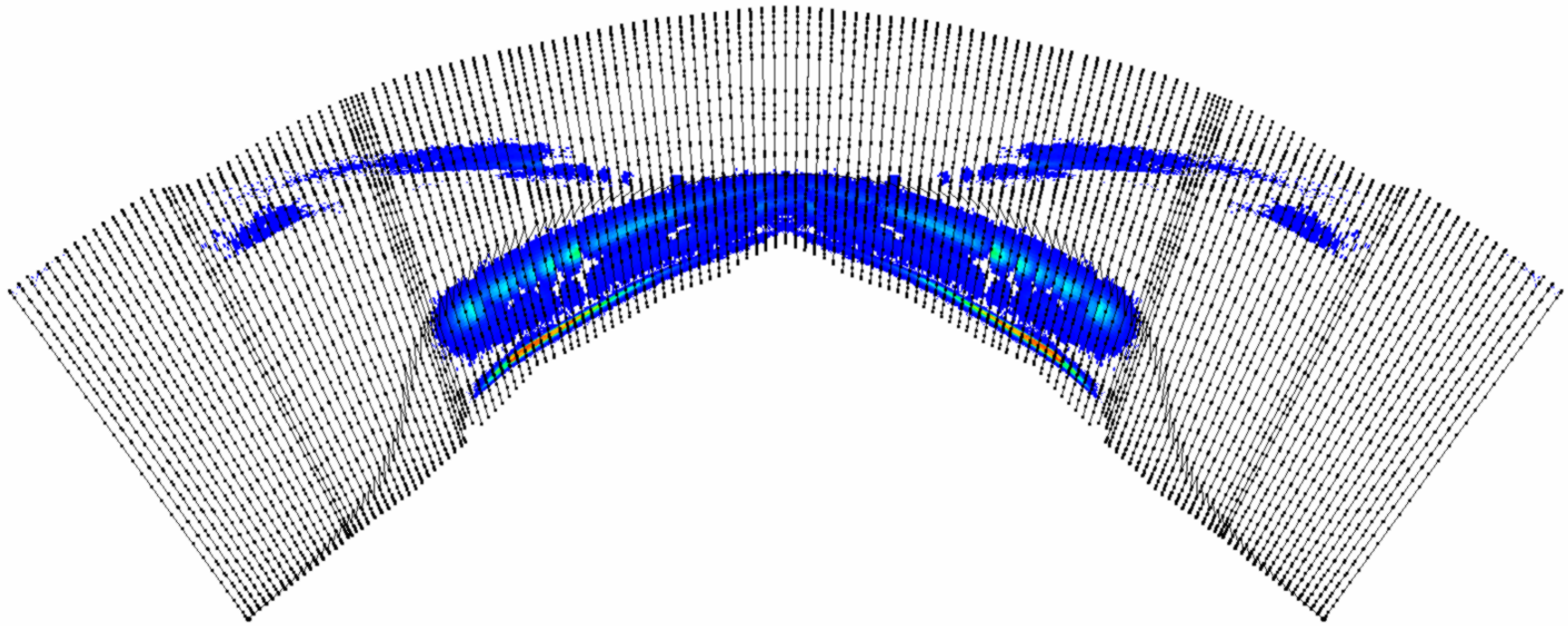
Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = 20 kA



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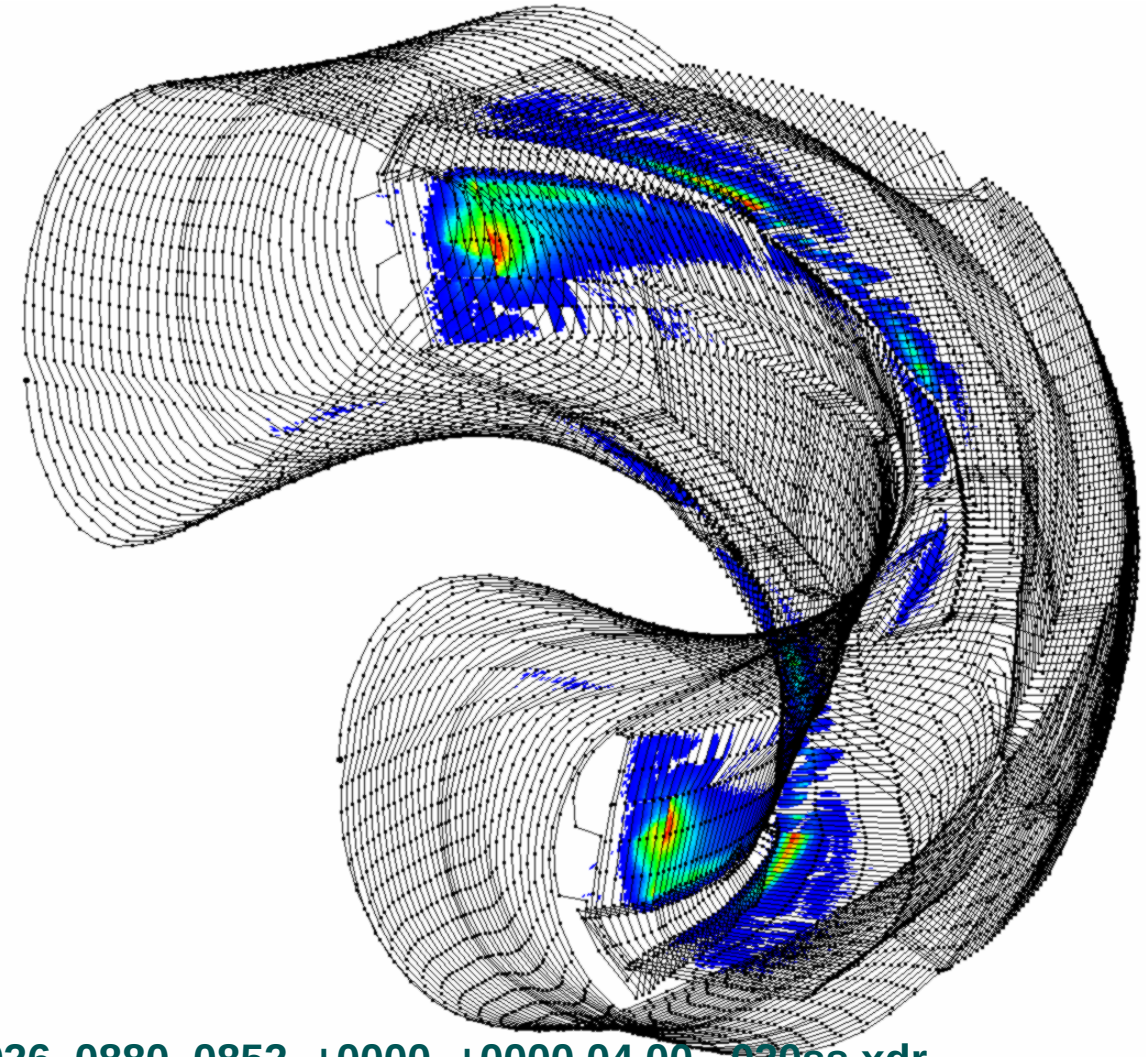
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -20 kA



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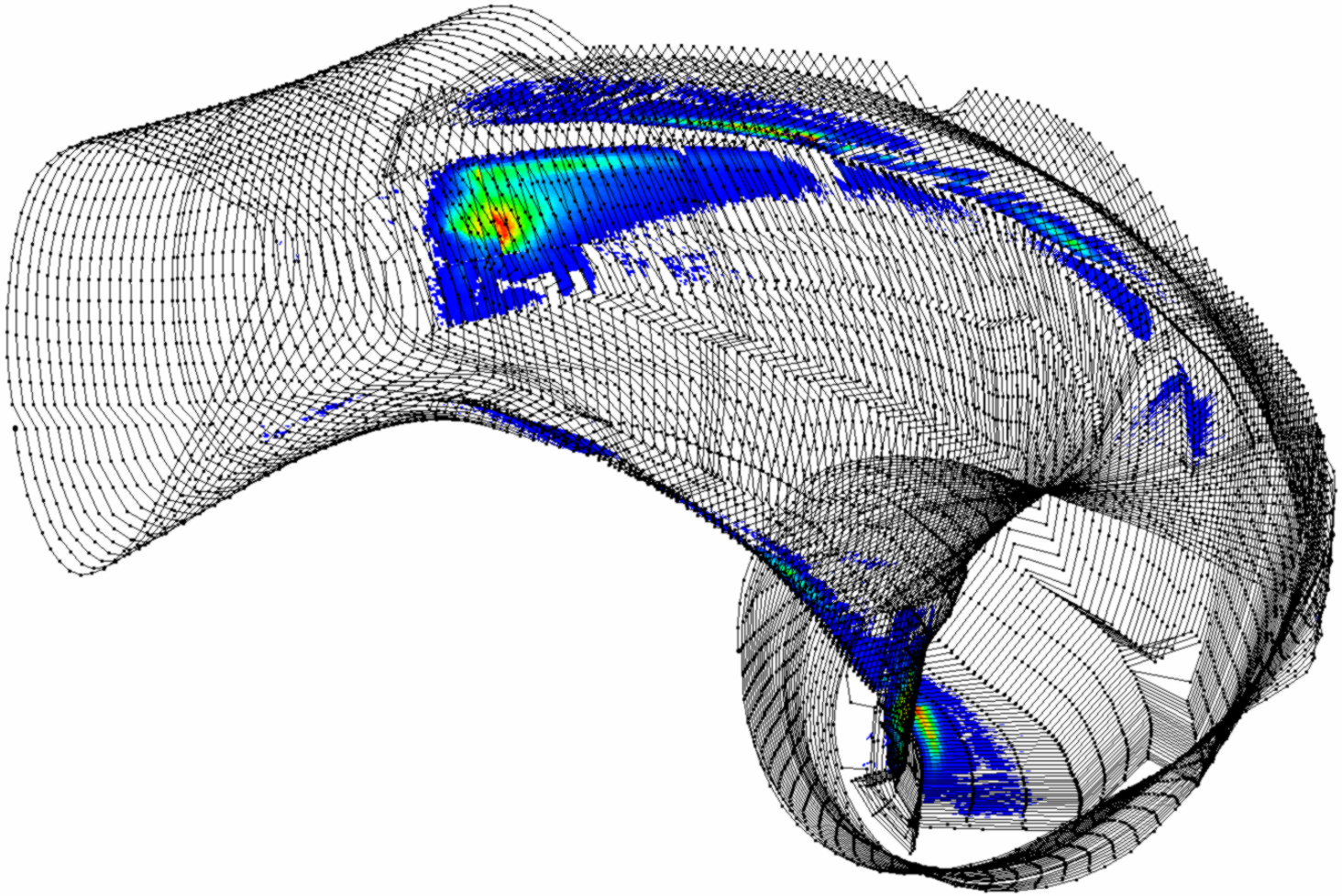
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -20 kA



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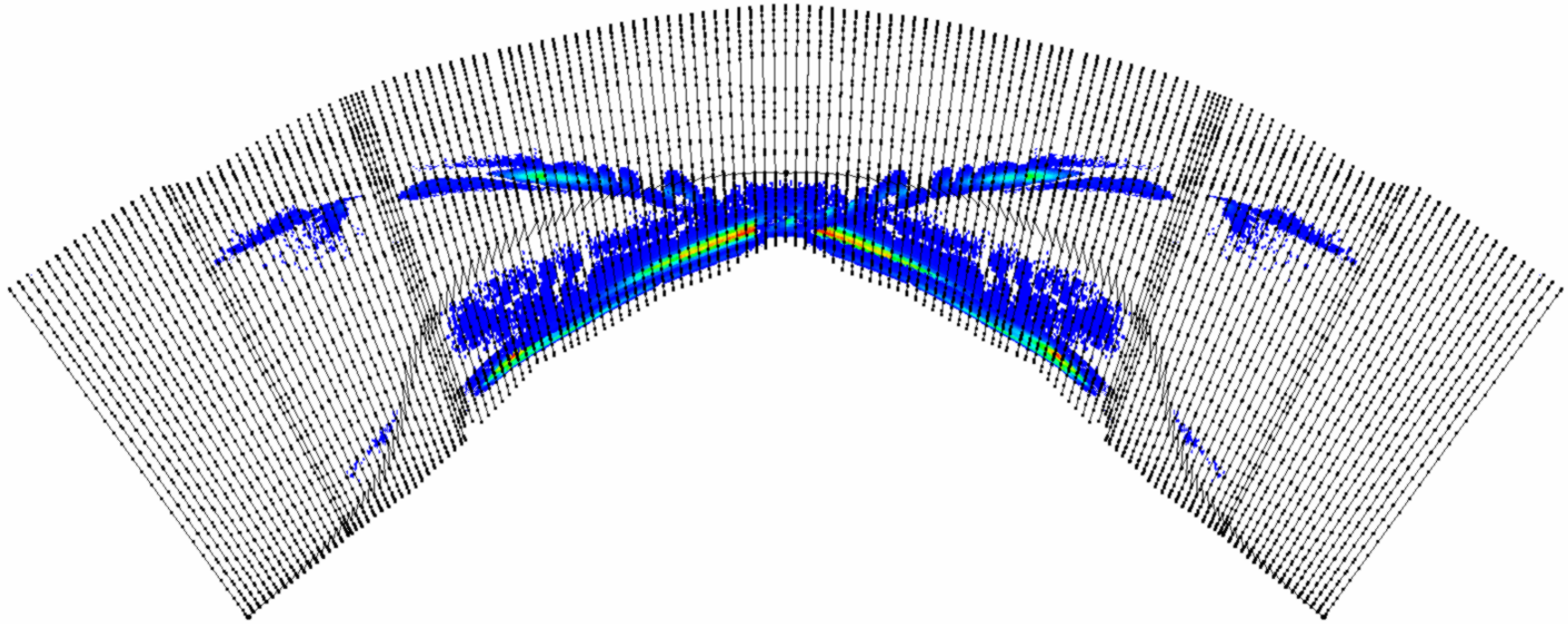
Originalgeometrie, High Mirror, Beta = 0,0 %, Itor = -20 kA



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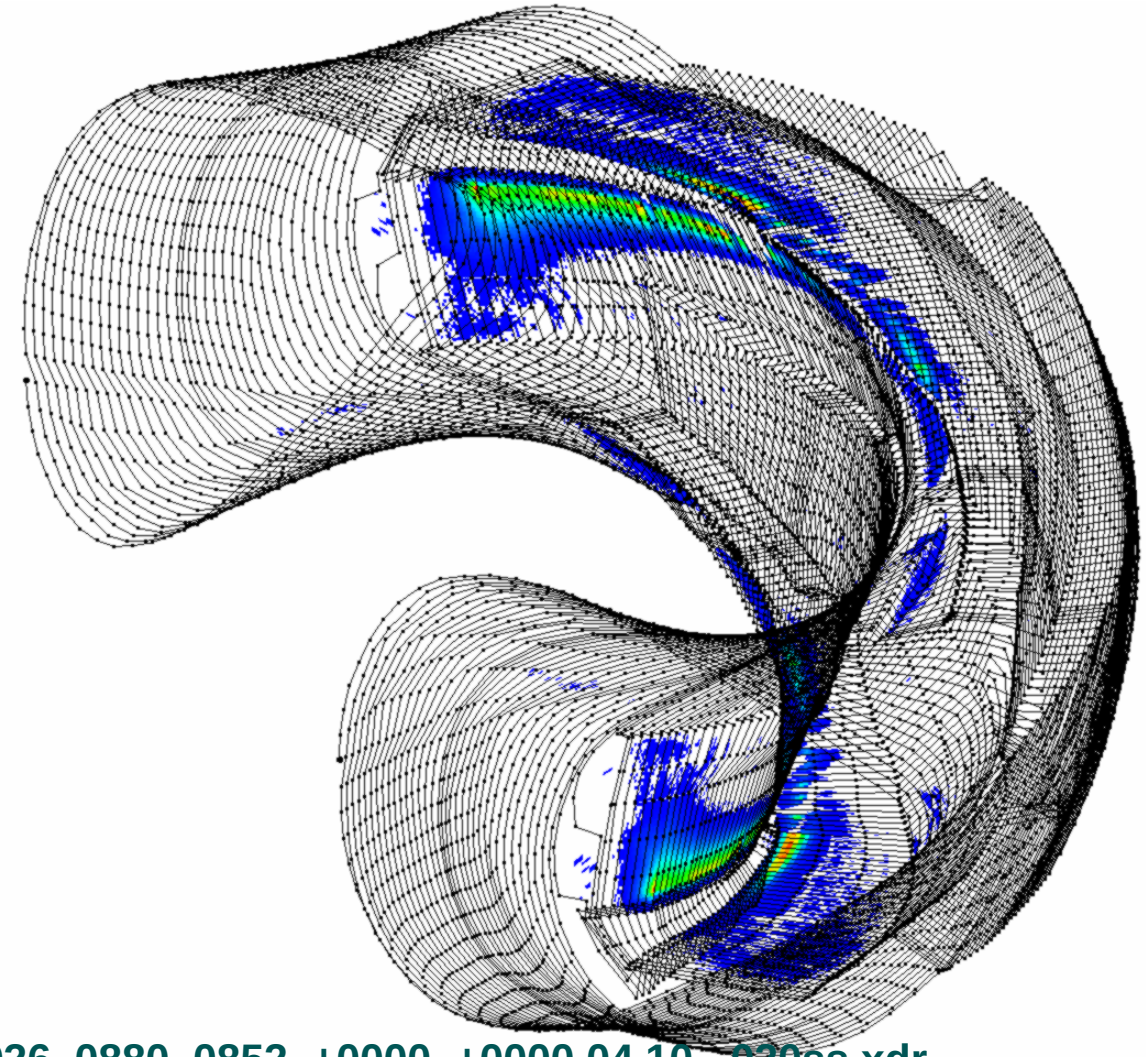
Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = -20 kA



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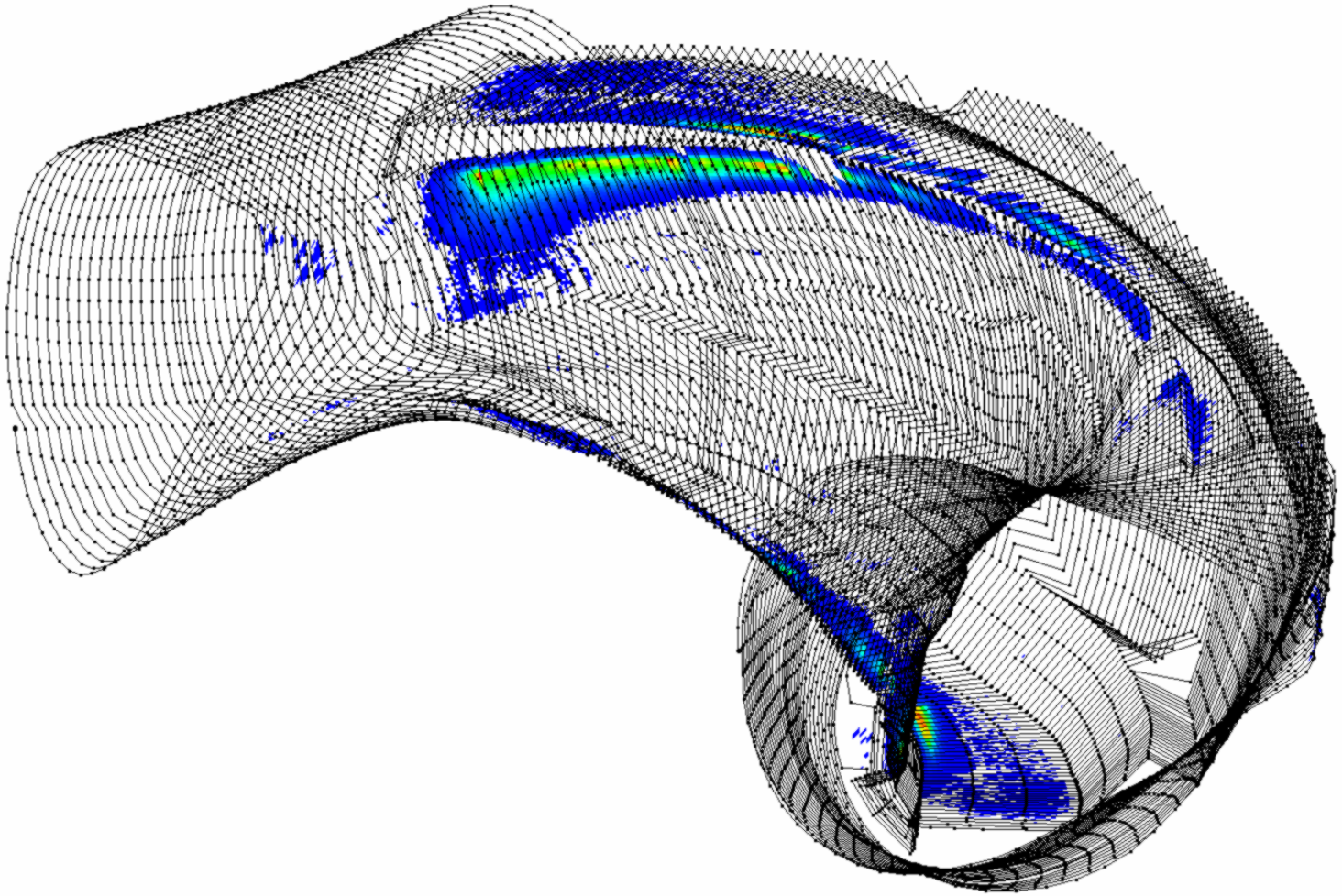

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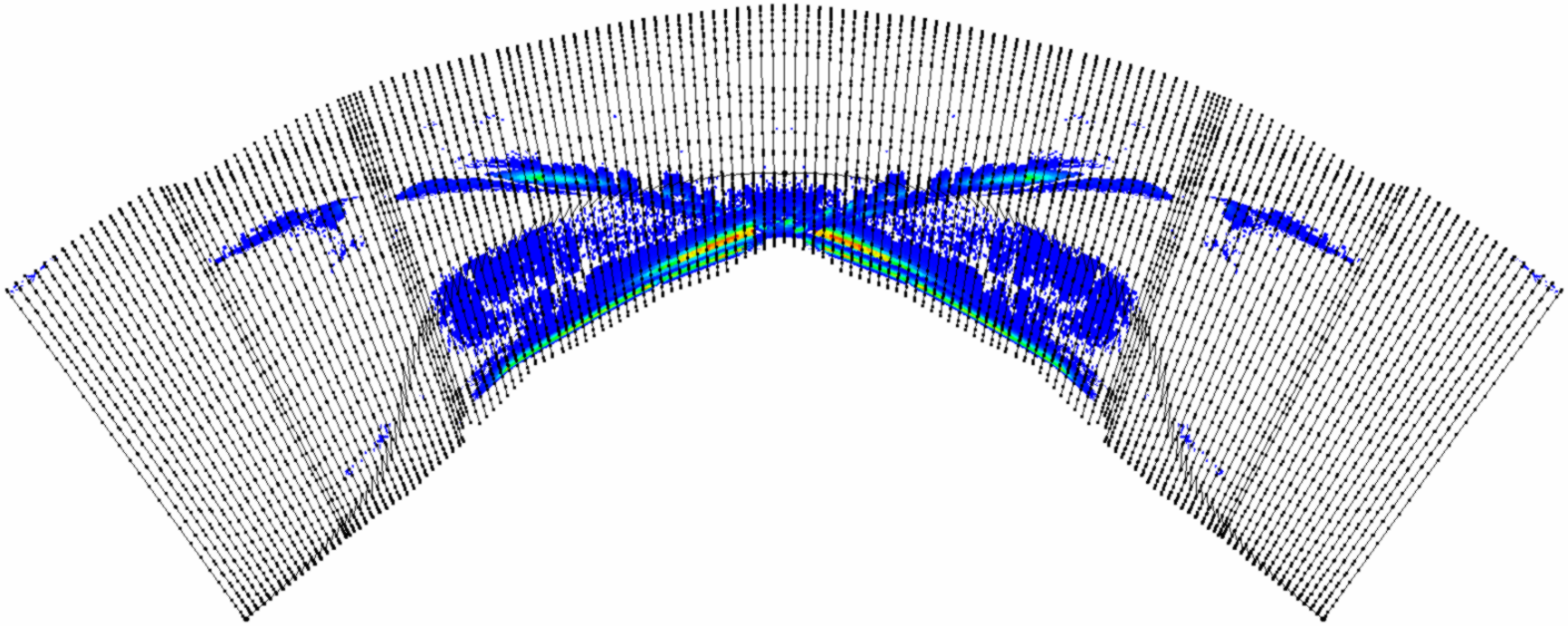
Originalgeometrie, High Mirror, Beta = 2,0 %, Itor = -20 kA



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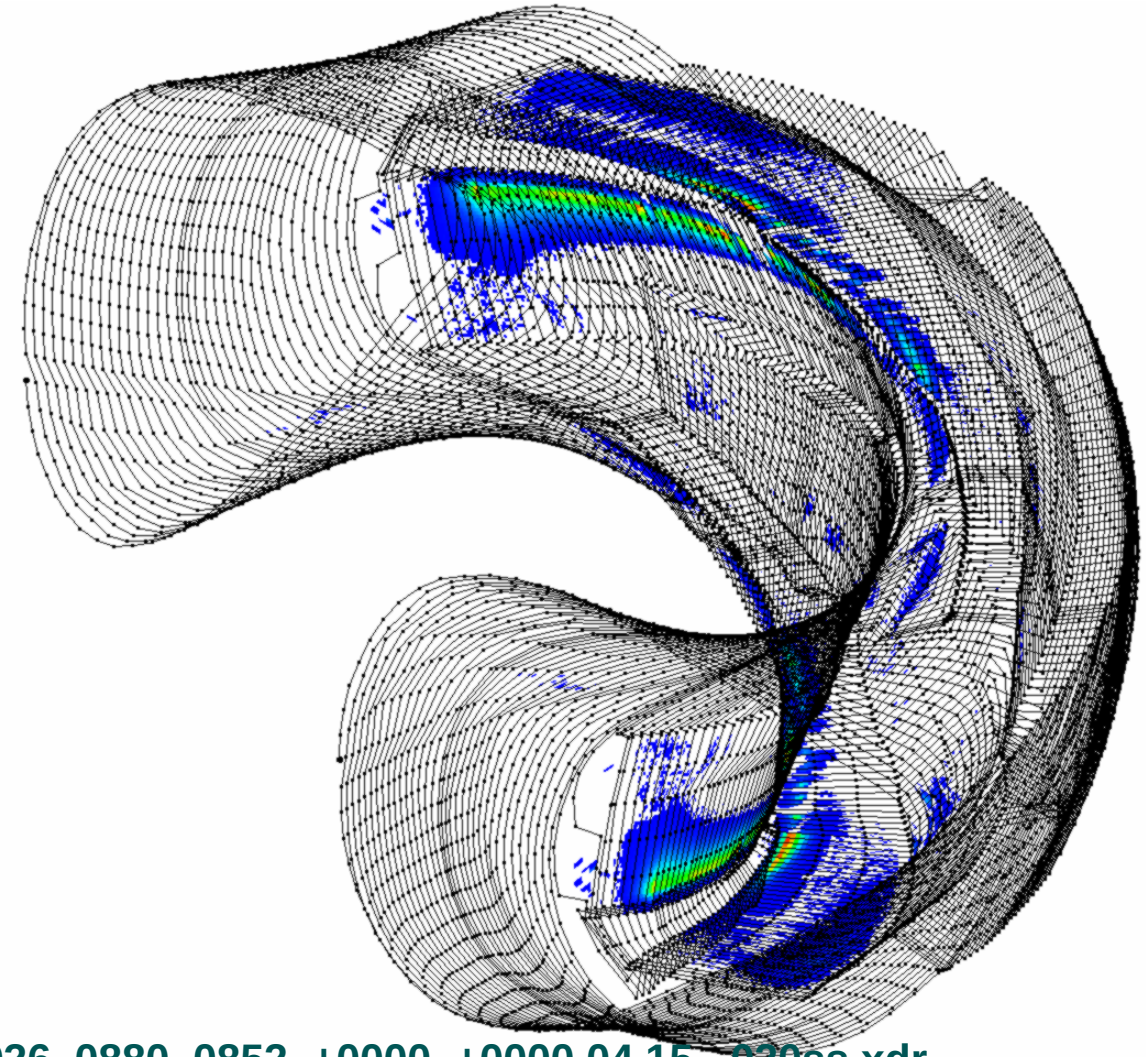
Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = -20 kA



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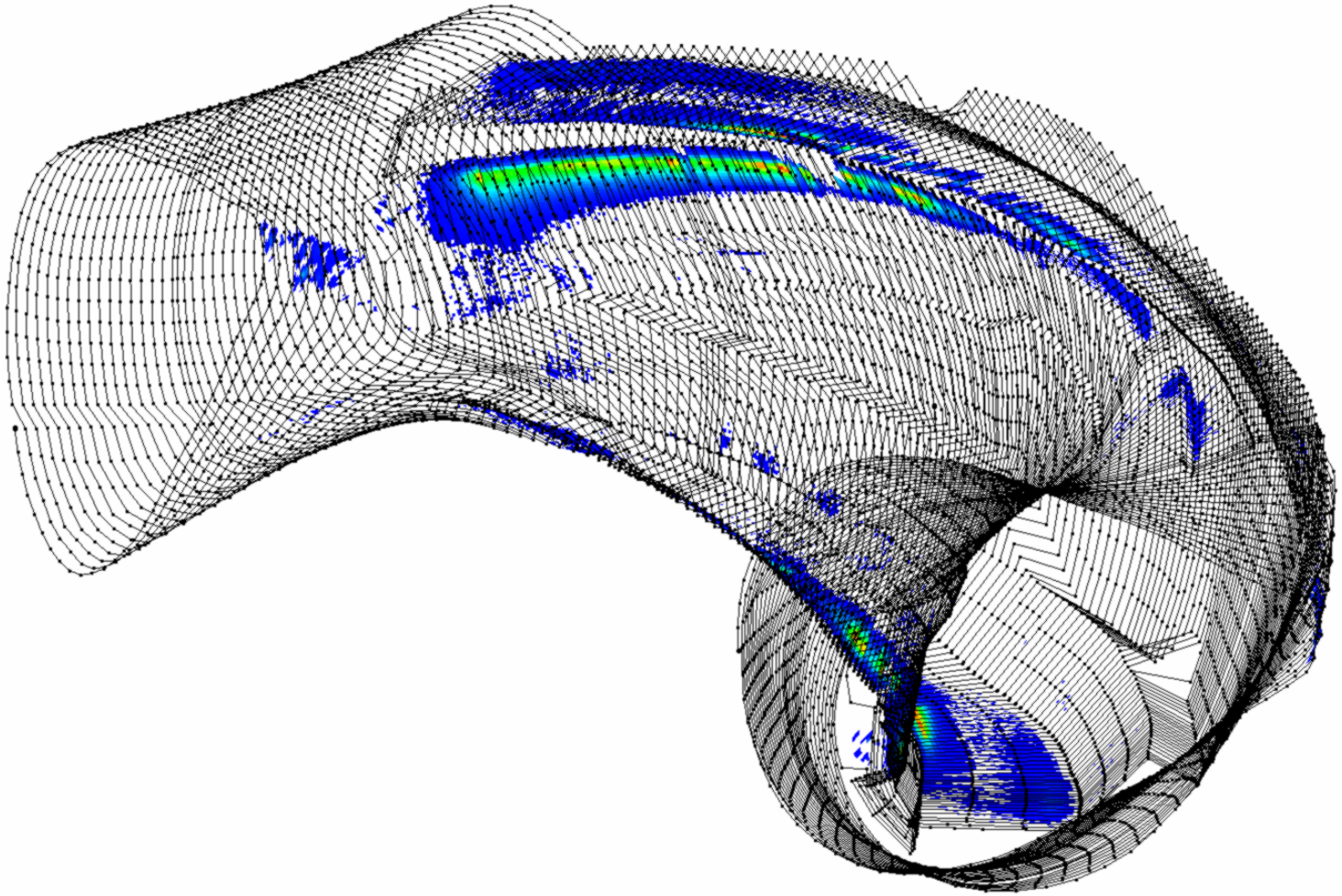

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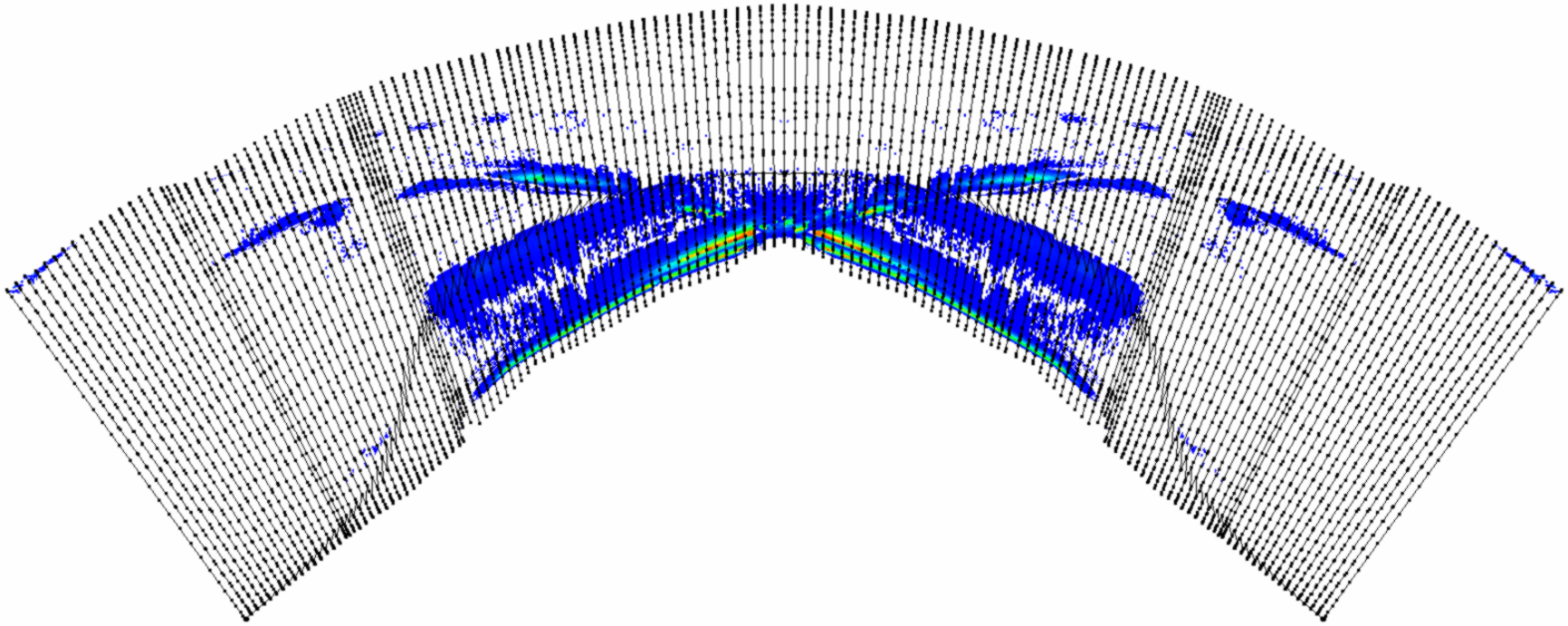
Originalgeometrie, High Mirror, Beta = 3,0 %, Itor = -20 kA



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Changes in heat load pattern with Itor = 0 and varied beta

Standard, Itor = 0 kA: with increasing beta, loads on the vertical target develop into a strike line, while low heat loads spread over a larger area on the horizontal targets. For Beta >2,69 % a second strikeline appears on TMh. Loads appear on the outer baffle.

High Iota, Itor = 0 kA: Very little change. With increasing beta the strike line on TMh gets slightly narrower and heat loads concentrate on a smaller area.

High Mirror, Itor = 0 kA: with increasing beta the strike line on TMv gets less pronounced and heat loads gradually move towards TMh. At Beta = 3 % a second, weakly pronounced strikeline appears on the outer half of TMh.

Changes in heat load pattern with varied Itor

Standard, Beta = 0,16%: with increasing Itor (positive) loads on the vertical target increase, with increasing Itor (negative) loads on the vertical target decrease, strike line on horizontal target shows increased load. In the range of -10 to -20kA the strike line on TMh moves towards the pumping gap.

High Iota, Beta = 0%: with increasing Itor (positive) loads on the vertical target decrease, resulting in higher loads on the horizontal part, the strike line becomes slightly broader.

With increasing Itor (negative) a redistribution of the loads from the horizontal to the vertical targets appears. Opposite to the standard configuration.

High Mirror, Beta = 0%: almost identical effects like in standard configuration.

Changes in heat load pattern with Itor ≈ ±10 kA and varied beta

Standard, Itor = 12 kA: with increasing beta, the heat load on TMv decreases and the load on TMh increases. For beta > 2% a second strike line on the outside of TMh appears.

Standard, Itor = -12 kA: with increasing beta, the heat load on TMv increases slightly, otherwise almost no changes

High Iota, Itor = 10 kA: almost no change.

High Iota, Itor = -10 kA: two out of four simulations failed.

High Mirror: Very similar to Standard

High Mirror, Itor = 10 kA: with increasing beta, the heat load on TMv decreases and the load on TMh increases. On TMh, two strikelines develop. (Similar Standard)

High Mirror, Itor = -10 kA: with increasing beta, the heat load on TMv decreases slightly and the loaded area on TMh increases. Two strikelines become visible on TMh.

Changes in heat load pattern with Itor ≈ ±20 kA and varied beta

Standard, Itor = 20/24 kA: with increasing beta, the heat load on TMv decreases and the load on TMh increases. For beta > 2% a second strike line on the outside of TMh appears.

Standard, Itor = -20/-24 kA: with increasing beta, the heat load on TMv increases slightly, otherwise almost no changes. With higher beta the strike line approaches the pumping gap.

The behaviour for both pos. and neg. Itor is very similar to the behaviour at Itor ≈ ± 10 kA.

High Iota, Itor = 20 kA: with increasing beta, the strike line gets almost unnoticeable narrower.

High Iota, Itor = -20 kA: with increasing beta, the heat load patch on TMv decreases and the strike line becomes slightly larger (first longer, then thicker).

High Mirror: Very similar to Standard

High Mirror, Itor = 20 kA: with increasing beta, the heat load on TMv gradually decreases and the load on TMh increases.

High Mirror, Itor = -20 kA: with increasing beta, the heat load on TMv decreases slightly and the loaded area on TMh increases.