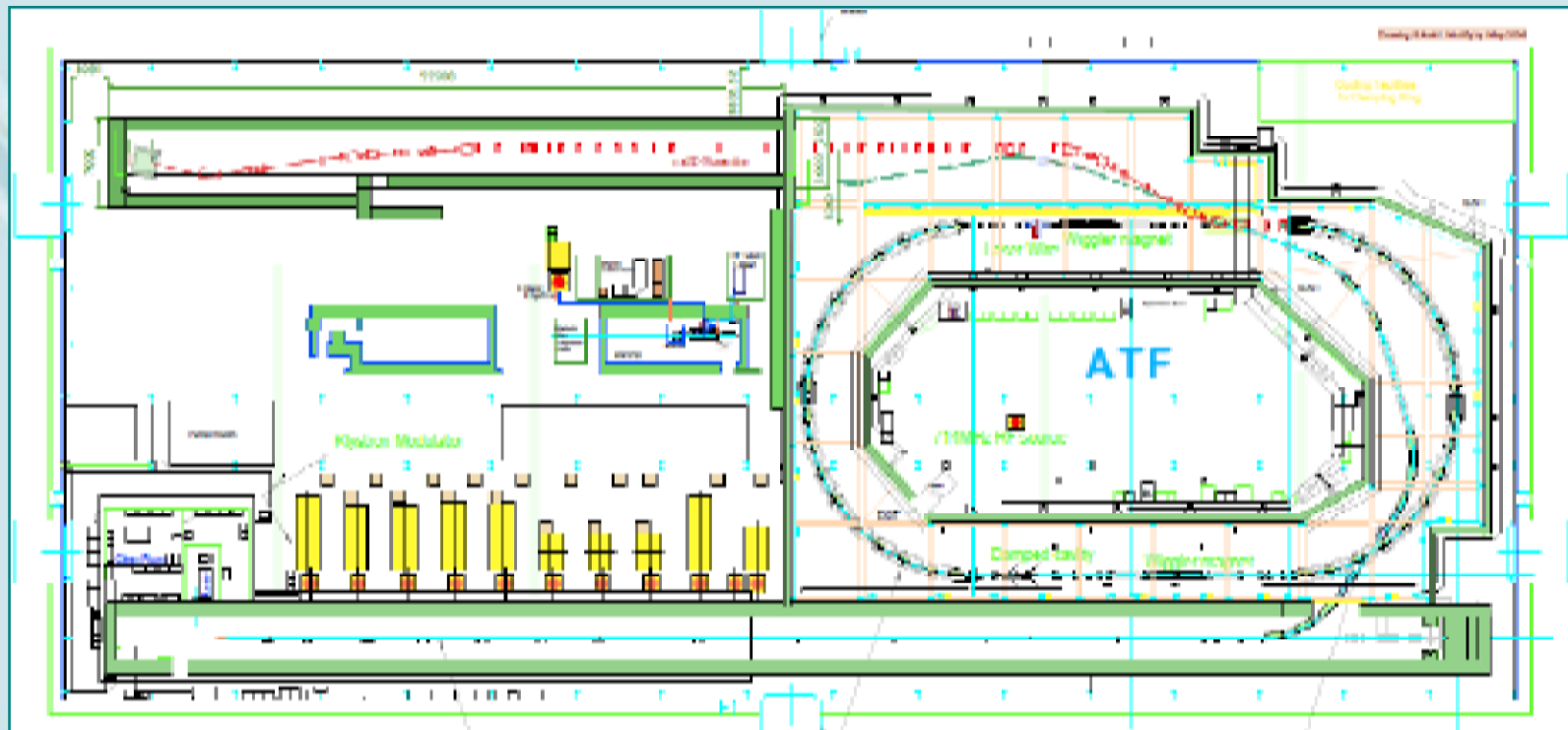


# ATF Extraction Septa Magnetic Modeling with ANSYS

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# Motivation.....

- Vertical emittance growth observed at ATF post extraction vs. damping ring.
- Orbit unknown in extraction channel from kicker to exit of extraction septa due to kicker noise interference with BPMs.
- No existing magnetic models/measurements available, may be held by manufacturer as proprietary.



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# Why Use ANSYS?

- Efficient and accurate model generation using SolidEdge.
- Powerful and flexible meshing capabilities.
- Current sources can be modeled in a number of ways from primitives to circuit fed conductors.
- Static, harmonic, and transient analysis.
- Results can be used for mechanical, thermal analysis.



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# Progress Report....

- Received drawings of extraction septa A, B, C from Mark Woodley.
- Received drawings of beam pipes and beam line layout from Tauchi-san at ATF2 meeting at SLAC.
- **Unfortunately no details of conductor connections at magnet ends, will need this to accurately model end effects in 3D. Drawings held by manufacturer.**
- Created SolidEdge 3D model of extraction septum A.
- Created preliminary 2D ANSYS static magnetic model of extraction septum A.

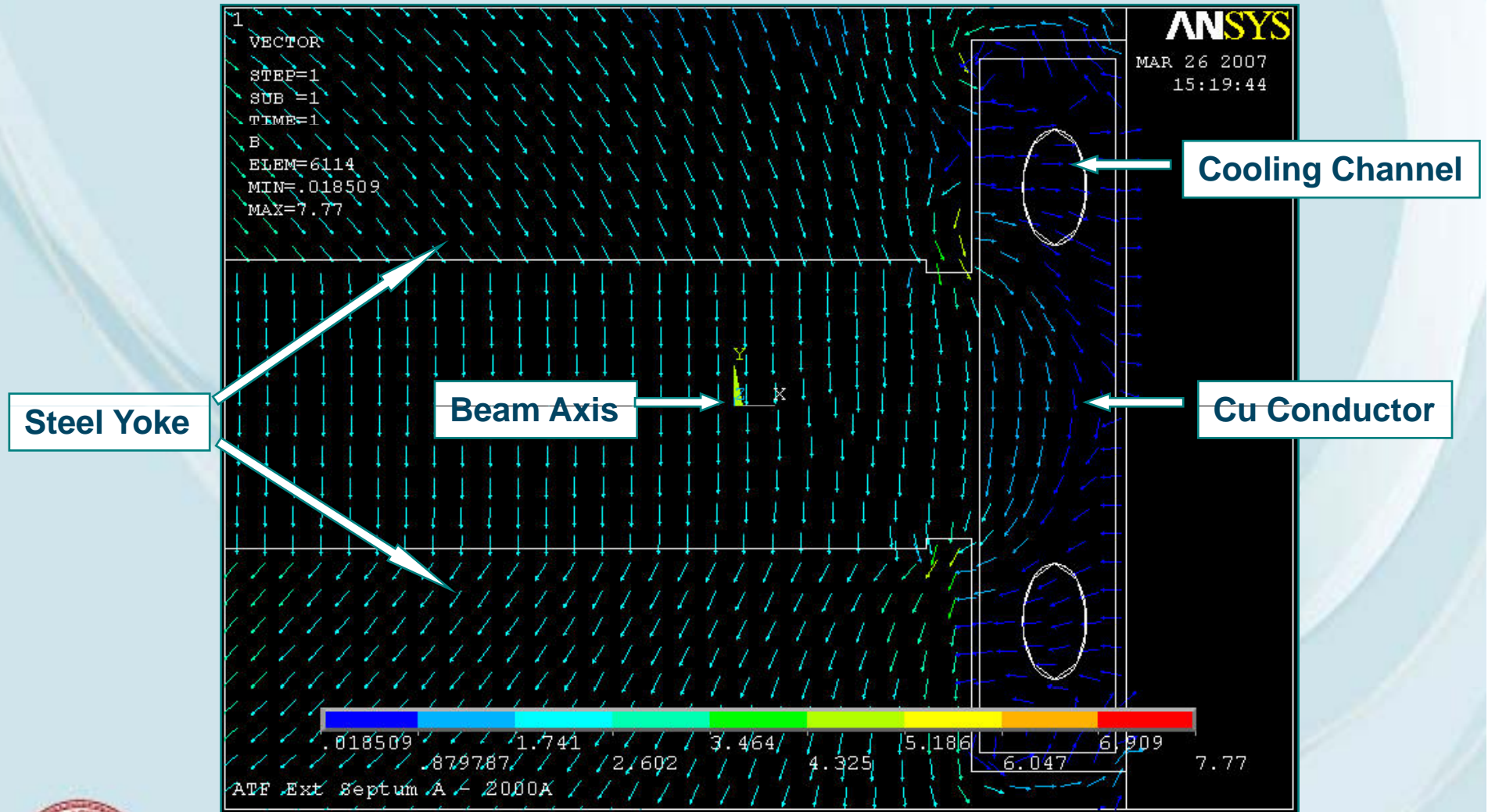


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# Preview of 2D Static Analysis



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# Next Steps...

- Complete models for extraction septa B and C.
- Compare ANSYS results with analytical calculations and Poisson results.
- B-H curve for steel yoke, as of now model uses relative permeability.
- Develop 3D magnetic modeling capabilities and model end effects when details of conductor become available.
- Get the data out to those who wish to do beam dynamics and tracking studies.
- **Model a real existing magnet which has magnetic measurements available to check agreement with ANSYS.**



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# Questions for End Users of ANSYS Magnetic Models

ANSYS yields B and H vector components. Coordinates as of now are referenced to beam centered at (0,0).

- What resolution is needed?
- What about file format?
- Multipole content?
- What have I forgotten?



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