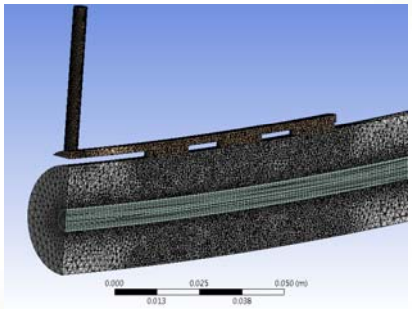
Pressure Drop of the ITER Cable-in-Conduit Conductor (CICC)

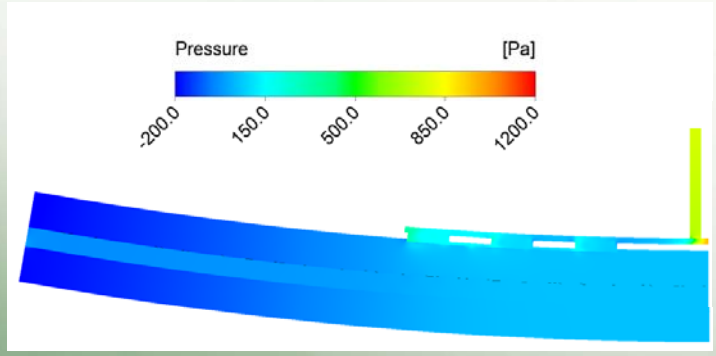
Modeling and Simulation Group

Computational Sciences & Engineering Division

CICC



3D model of the inlet manifold



Pressure contours in the inlet manifold+CICC

Problem Statement:

- **ITER magnets use cable-in-conduit conductors (CICC) that are cooled by forced flow supercritical helium at a temperature of 4.5K and a pressure of 6 bar. The Helium is inserted through an inlet manifold for which its hydraulic properties were investigated numerically.**

Technical Approach:

- **The ITER CICC is of a multi-channel nature, where strands containing the superconducting filaments are twisted in sub-bundles delimited by wrapping and concentrated in an annular region, with a central channel, delimited by a spiral. In order to solve the problem in a reasonable time manner, the cable bundle is represented as an isotropic porous-medium for which parameters have been deduced from experimental measurements.**

Benefit:

- **Simulations can help to validate engineering design and investigate the impacts of external forces such as electromagnetic forces.**

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