Boundary working group simulations of ITER-FEAT

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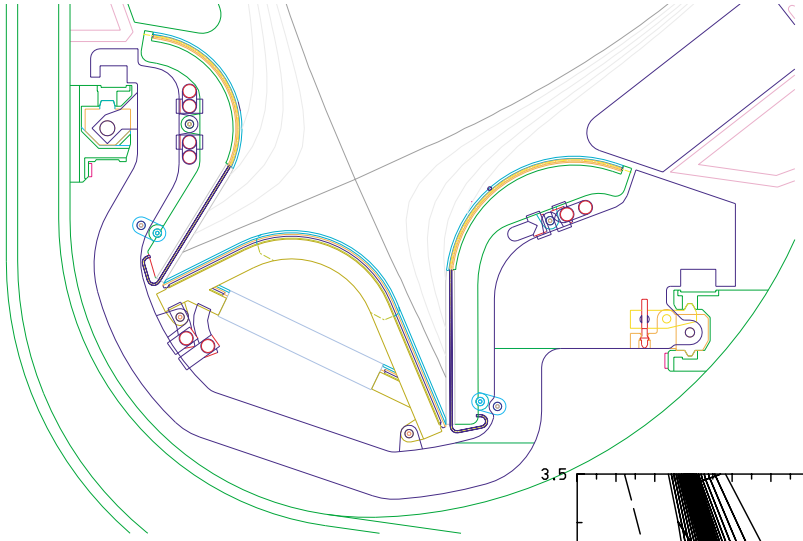
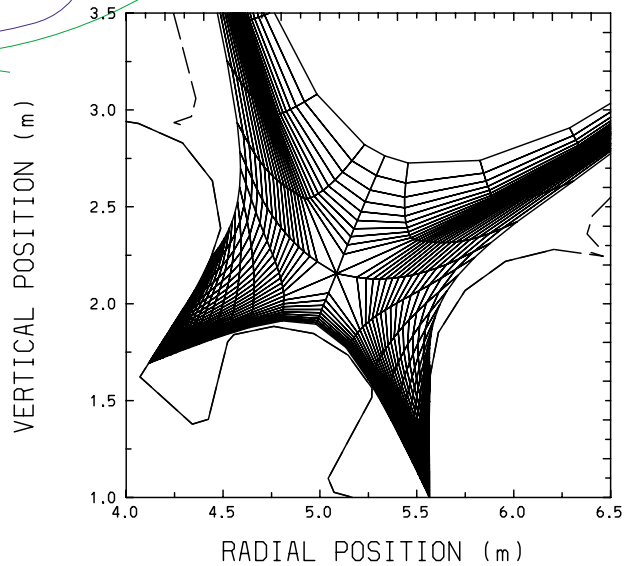
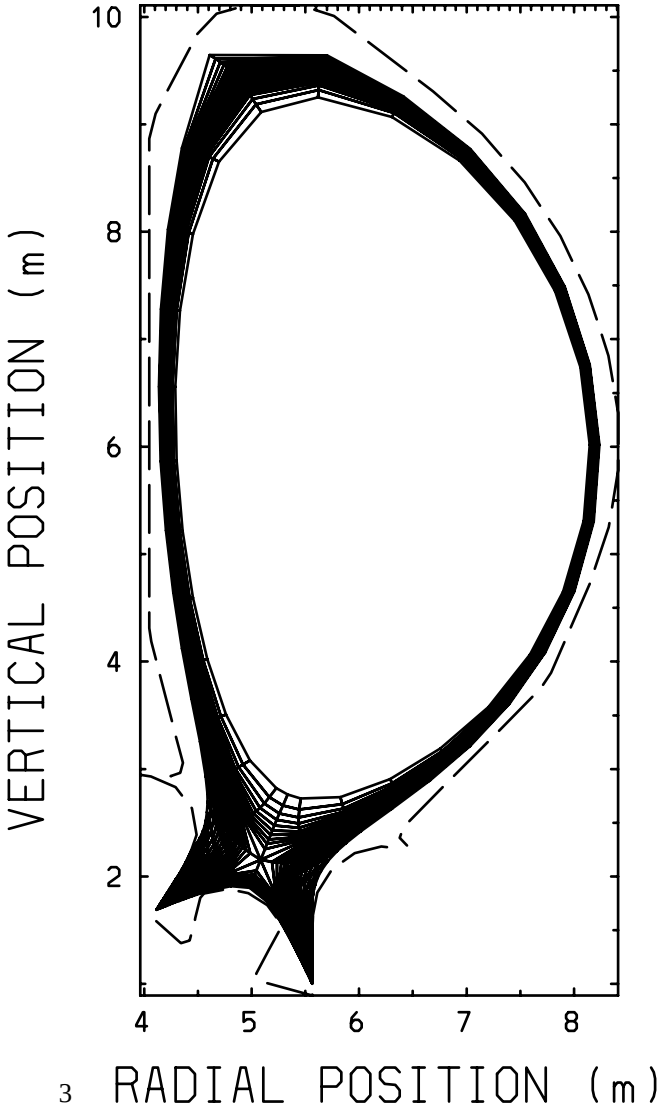
Assessment technique

- Boundary/divertor plasma thoroughly modeled by ITER team with B2/EIRENE and other codes
- We did simpler model using UEDGE
- Principle question addressed was evaluation of peak exhaust power heat flux
- Transport question examined with BOUT
- High Z concern examined using DIVIMP

Simulation grid closely reproduces ITER divertor shape







Summary

- There are no issues which would argue for not building device, only concerns which should motivate studies on present devices
- Simple model consistent with more complete ITER team modeling effort
- Divertor power flux appears to be within engineering capabilities (10 MW/m^2)
  - May require impurity seeding if edge transport is too low

Areas of concern

- Effect of ELMs on divertor heat load
- Tritium retention from codeposition with carbon
  - JET results indicate tritium deposited in localized area
  - Need to understand carbon transport to know where that will be in ITER
- Need to better understand particle throughput and pedestal parameters

Areas of concern (2)

- Sensitivity of divertor power to transport coefficients
  - Need to have better transport scaling laws
  - Need to have better model for D/χ
  - Need more turbulence simulations
- Effect of tungsten sputtering by low Z impurities