

Fast Ion Loss to NSTX Divertor Region and Implications for the LLD

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Could NBI losses affect LLD?



- Answer: **Unlikely**
- Synopsis of NSTX NBI loss calculations follows (1999, with Kaye, Mikkelsen, Akers)

Followed full population of NB ions for several equilibria

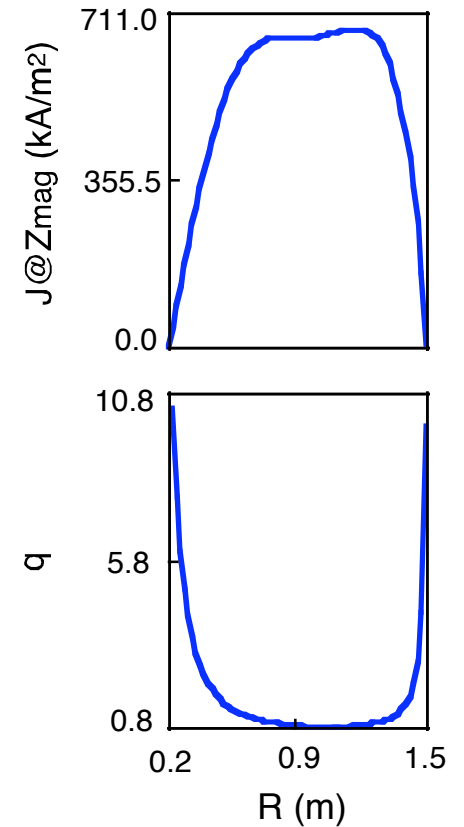
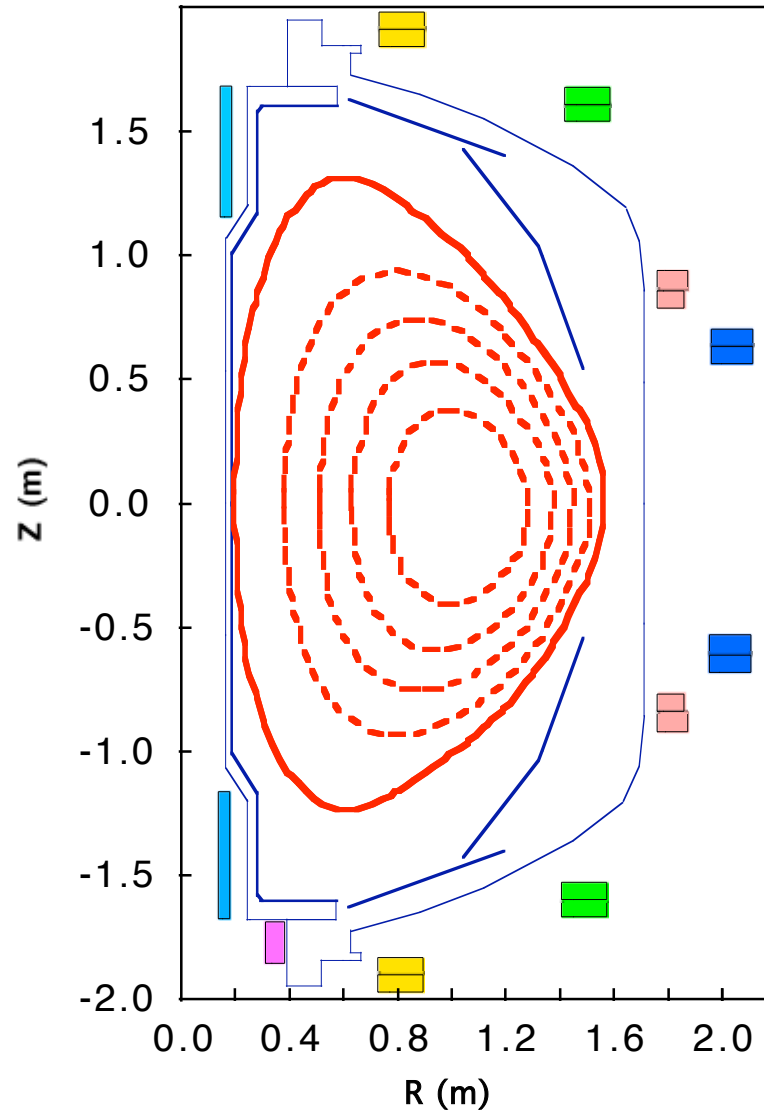


- Followed full gyroorbits until particles struck wall
- Tabulated power deposited vs position on wall
- Consider 0.5 & 1.0 MA cases
- (Note: modeled, not actual equilibria used!)

Sample 1 MA plasma

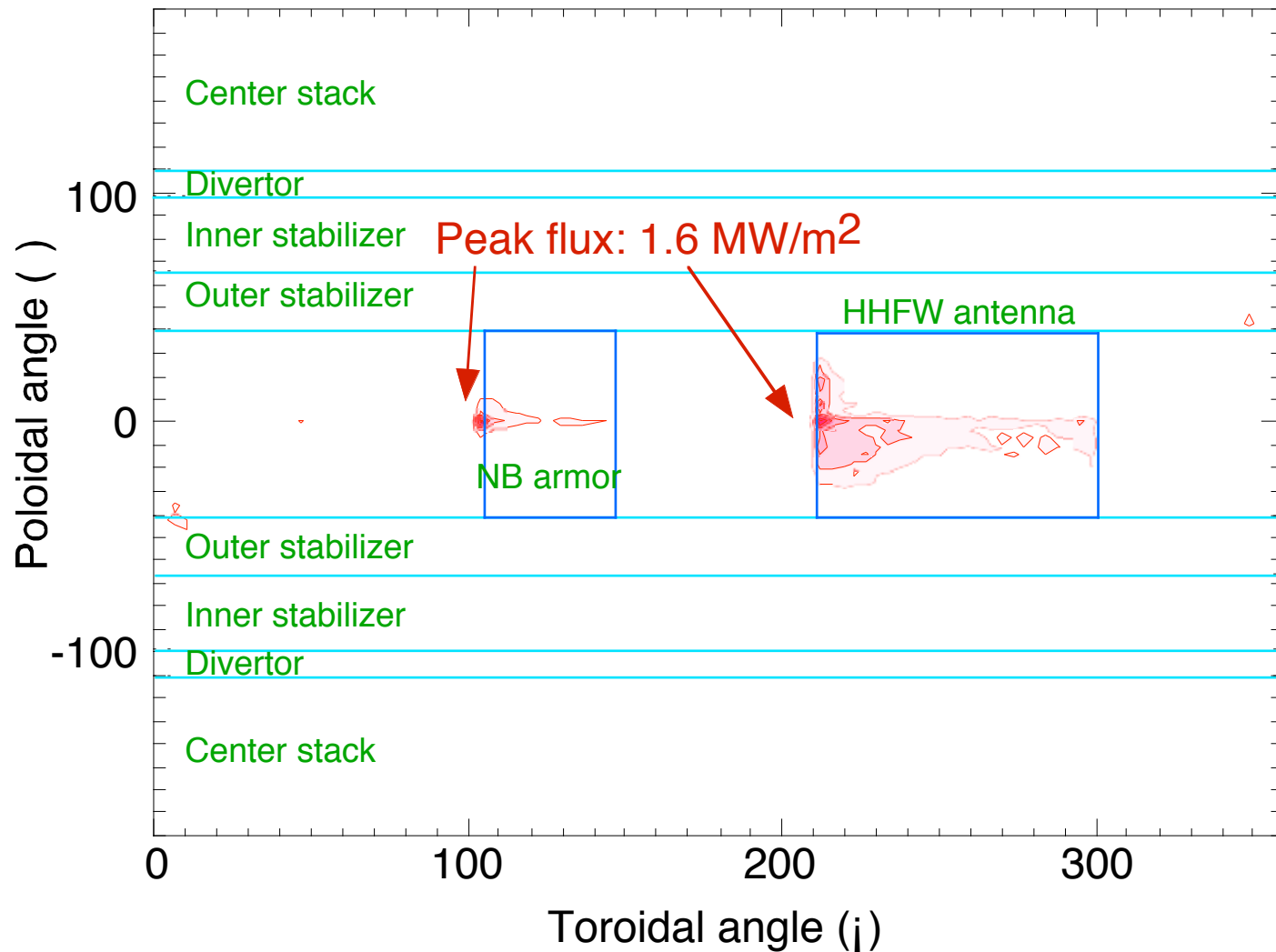


- $\beta_T = 23\%$
- $B_T = 0.3$ T
- $q_0 = 0.8$



Loss concentrated at outer midplane

Contour interval: 0.25 MW/m^2
 0.6 MW total loss

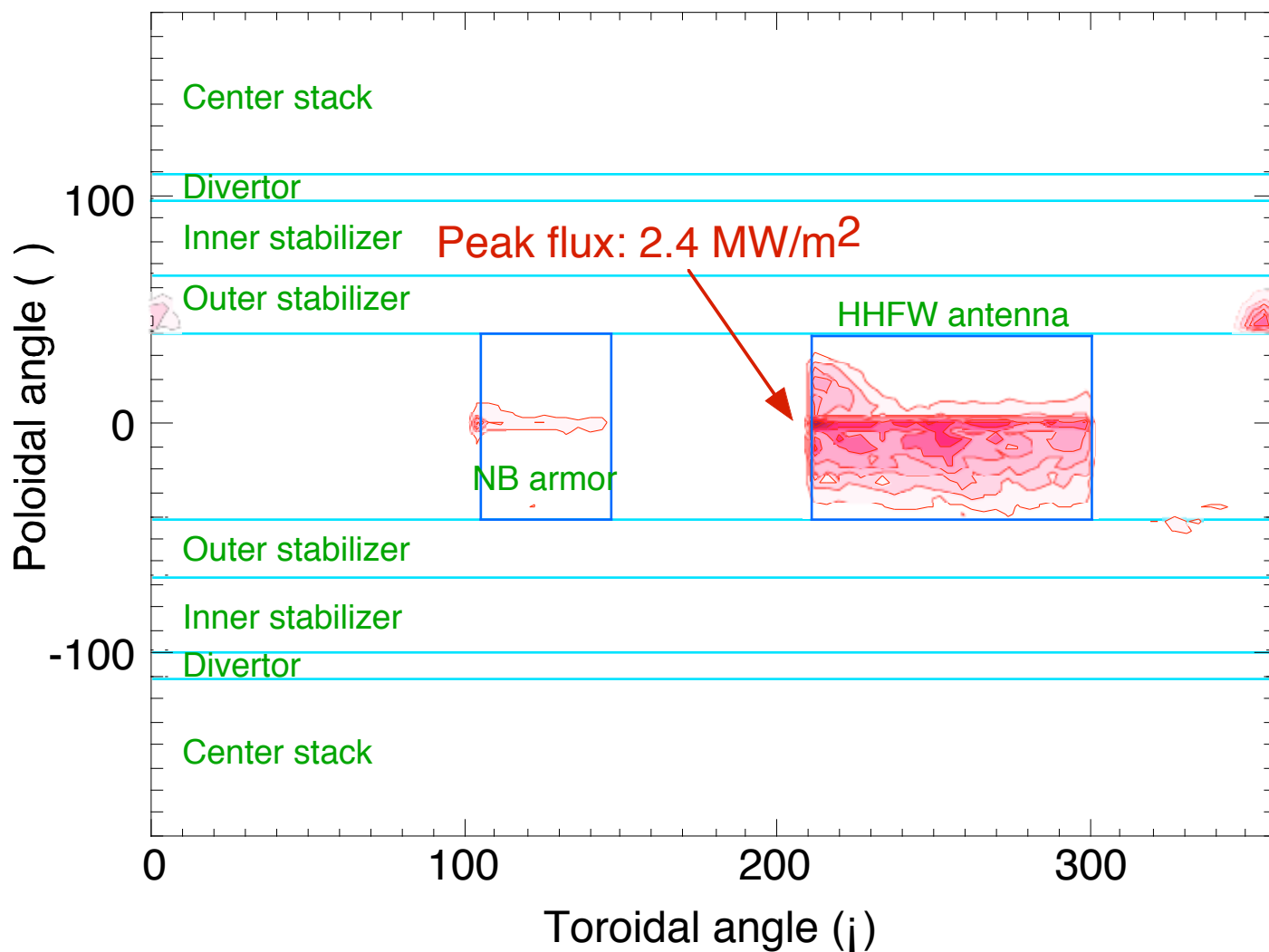


1 MA, 3
sources

No loss to divertor, even at 0.5 MA

- 0.5 MA, 3 sources
- Modest loss at outer stabilizers

Contour interval: 0.25 MW/m^2
2.0 MW total loss



$I_p < 0.25$ MA problematic?



- Loss fraction gets large below 0.5 MA
- grad-B drift will carry lost ions to bottom of vessel
- Only likely during I_p rampup or CHI

