



# **Initial Beam Ion Loss Measurements**

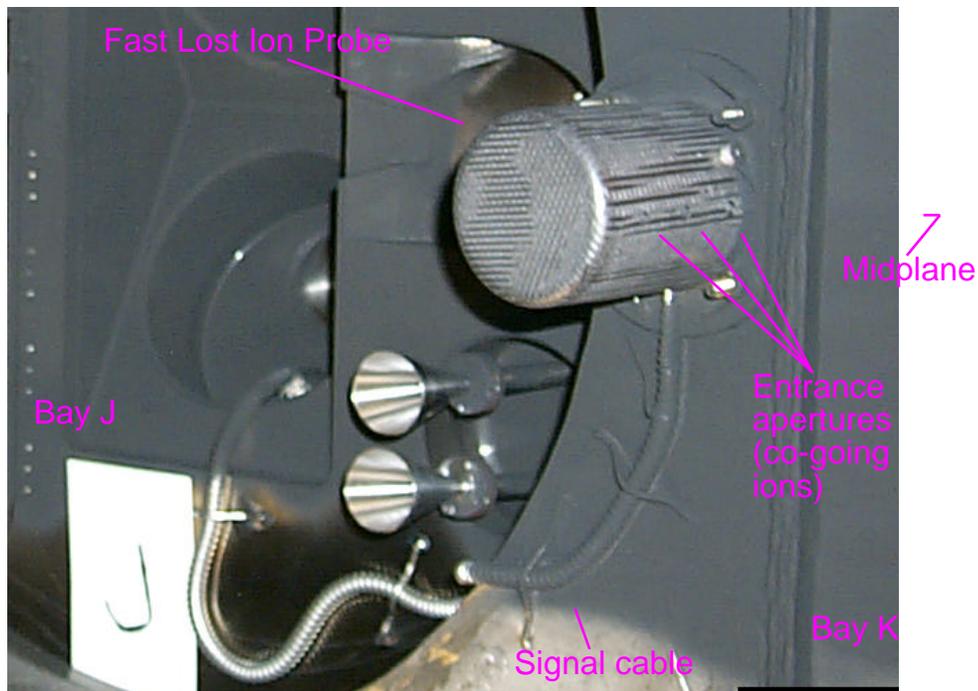
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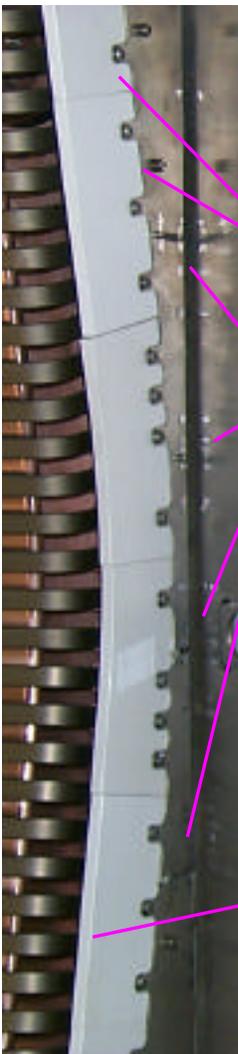
# 3 Methods to measure fast ion losses



- Thermocouples measure temperature rise of side plates of HHFW antenna when NB ions strike during shot
- IR camera measures temperature rise on side of antenna
- Faraday cup probe measure beam ion current near wall



# Thermocouples: beam heat load $\geq$ model prediction



Side of  
HHFW  
antenna

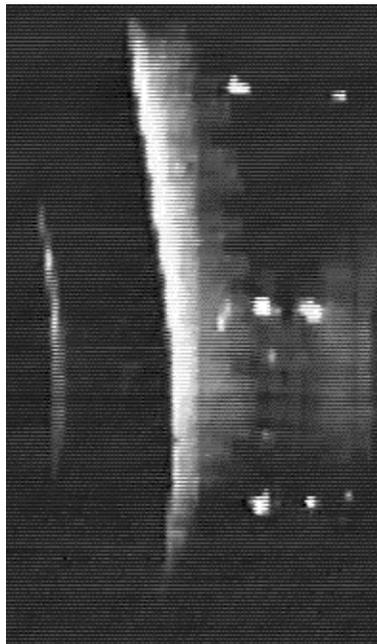
BN side plates

Thermocouple  
wires  
(thermocouples  
mounted inside  
BN side plates)

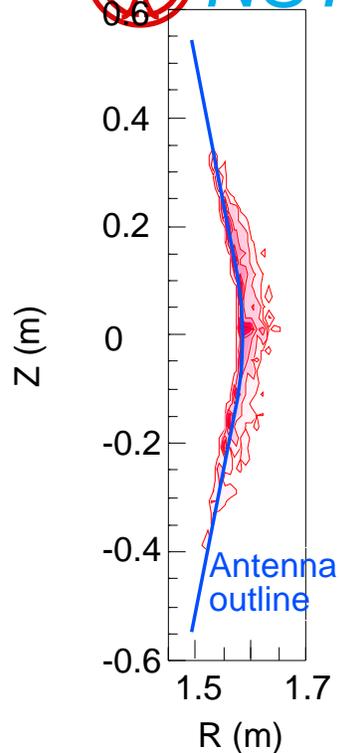
Faraday shield

- #103815: 3 MW, 0.17 s,  $T=3.5\text{ }^{\circ}\text{C}$ ; model predicts  $T=4\text{ }^{\circ}\text{C}$ —good agreement
- #103812: 3 MW, 0.2 s,  $T=17\text{ }^{\circ}\text{C}$ , significantly higher than model prediction of  $4\text{ }^{\circ}\text{C}$

# Beam ion heat load distribution on antenna similar to model prediction



IR camera image  
(shot 103336)

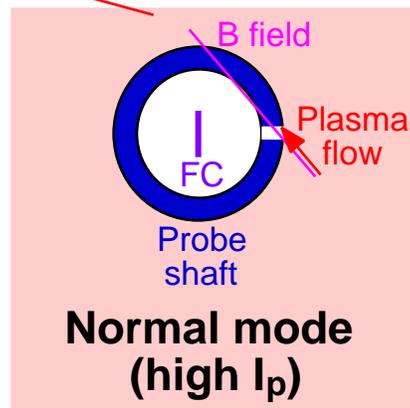
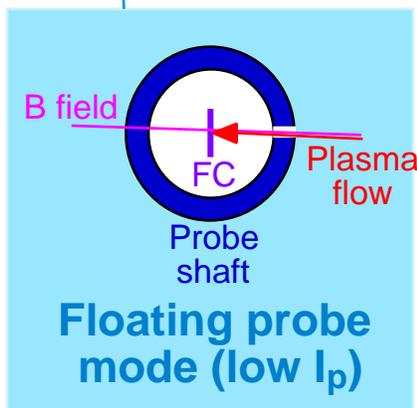
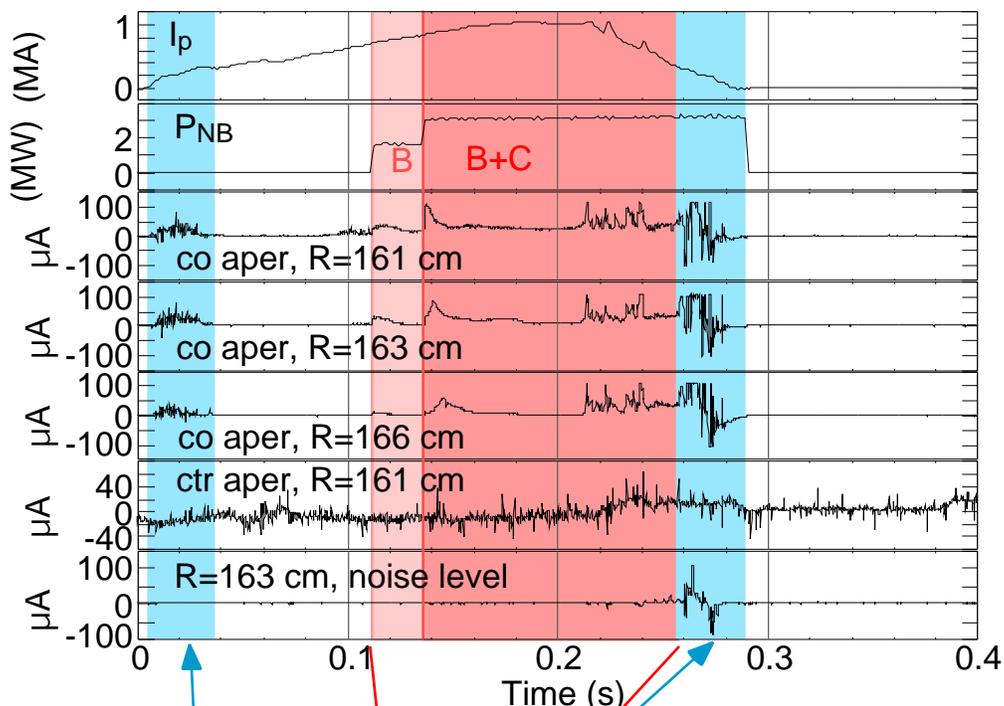


Model prediction  
for 1 MA plasma

- Heating pattern similar to model
- Model predicts  $\approx 4$  cm at midplane, observe  $\sim 4$  cm at  $Z=+20$  cm

# Faraday cup probe sees loss currents correlated with NBI, but smaller than expected

#103815  NSTX



# Preliminary Conclusions



- Different methods of measuring beam ion loss give differing answers, varying from much lower than model predictions (Faraday cups) to higher than model predictions (thermocouples)
- Need to do more work to sort things out