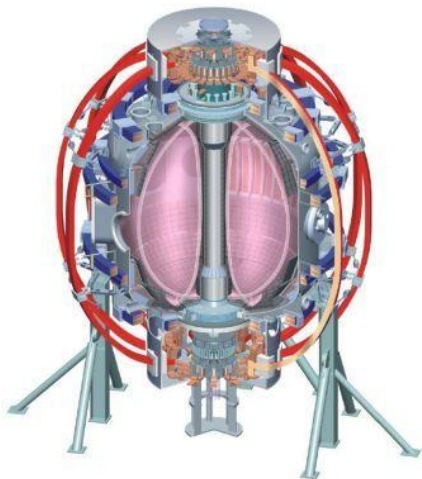


# X-point height scan at fixed strike point radius

College W&M  
 Colorado Sch Mines  
 Columbia U  
 CompX  
 General Atomics  
 INL  
 Johns Hopkins U  
 LANL  
 LLNL  
 Lodestar  
 MIT  
 Nova Photonics  
 New York U  
 Old Dominion U  
 ORNL  
 PPPL  
 PSI  
 Princeton U  
 Purdue U  
 SNL  
 Think Tank, Inc.  
 UC Davis  
 UC Irvine  
 UCLA  
 UCSD  
 U Colorado  
 U Illinois  
 U Maryland  
 U Rochester  
 U Washington  
 U Wisconsin

## J.M. Canik, ORNL

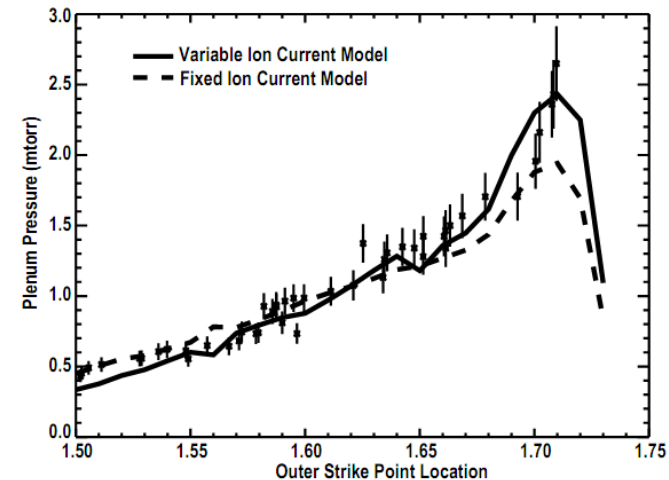
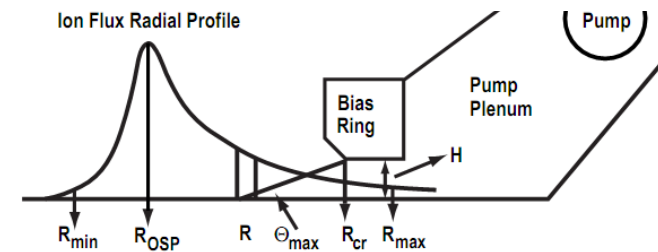
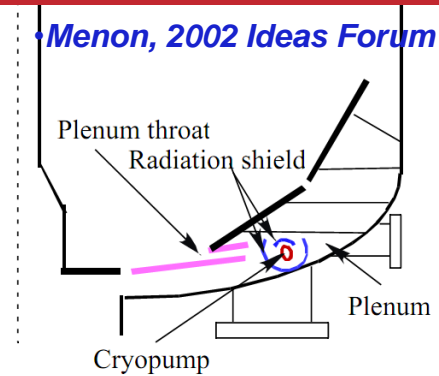
**NSTX FY11-12 Research Forum**  
**Princeton, NJ**  
**Mar 17, 2011**



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 POSTECH  
 ASIPP  
 ENEA, Frascati  
 CEA, Cadarache  
 IPP, Jülich  
 IPP, Garching  
 ASCR, Czech Rep  
 U Quebec

# Cryo pump performance is sensitive to plasma parameters near pump entrance

- Possible cryo pumping system for the NSTX upgrade is being studied
  - Likely strategy : follow DIII-D design, pump in SOL
- Achievable plenum pressure strongly dependent on plasma parameters near plenum entrance
  - Predicted by analytic modeling
  - Confirmed by DIII-D experiments
- To make meaningful predictions, we need to know  $n_e$ ,  $T_e$ , particle flux near where the entrance is likely to be
- High flux expansion will affect performance
  - High FE -> low fluxes -> low pressure?
  - High FE -> broader flux footprint -> high flux near entrance -> high pressure?
  - Critical issue for upgrade, where very high flux expansion snowflake may be used



•Maingi, NF 99

# X-point height scan will vary flux expansion, document local parameters on HDLP

- 1 day XP: put HDLP where pump entrance is likely to be relative to OSP, document local plasma parameters as flux expansion is increased
- Start with high current (1-1.2 MA), high Xpt/low FE shape with drsep < -1 cm
  - Can reload 128640, raise  $I_p$
- Keep OSP fixed at 40 cm
  - Both OSP and pump likely to be at larger R
  - Makes outer divertor leg ~vertical
  - 40 cm might be too far, could do 50 instead
- Scan X-point height
  - 3 values: start with FE~10, move as close to plate as possible, one intermediate point
  - Time permitting, add divertor gas puff to increase recycling

