

XP-833: Halo Current Dependencies on $I_p/q, \dots$

- What is a halo current?
 - When the plasma loses vertical position control, it can come in contact with PFCs at the top/bottom of the VV.
 - Disruption flux changes create voltages that drive current linking both the plasma and the VV components.
 - The $J \times B$ force on VV components can be a HUGE problem in a larger tokamak.
- Reference: 600 kA, Ohmic, Helium, PF1A ($\delta_l=0.45$).
- Freeze vertical control, give a “kick” to push plasma down, measure currents in lower outboard divertor, CHI gap.
- Scan I_p , B_T , to see scaling of halo currents (12 shots)
- Develop a lower- shape with halo-currents linking the lower SPP and OBD. (14 shots, $\delta_l=0.33$, only partially successful)
- Repeat scan with new halo current path. (4 shots)
- Repeat scan in Deuterium. (1 shot)

Halo Current Diagnostics For CY08 Run

Rogowskis on the CSC

CSCL1, CSCL2, CSCU1

Two Arrays of 6 B_T coils

Inner Ring: Just Outside the CHI Gap

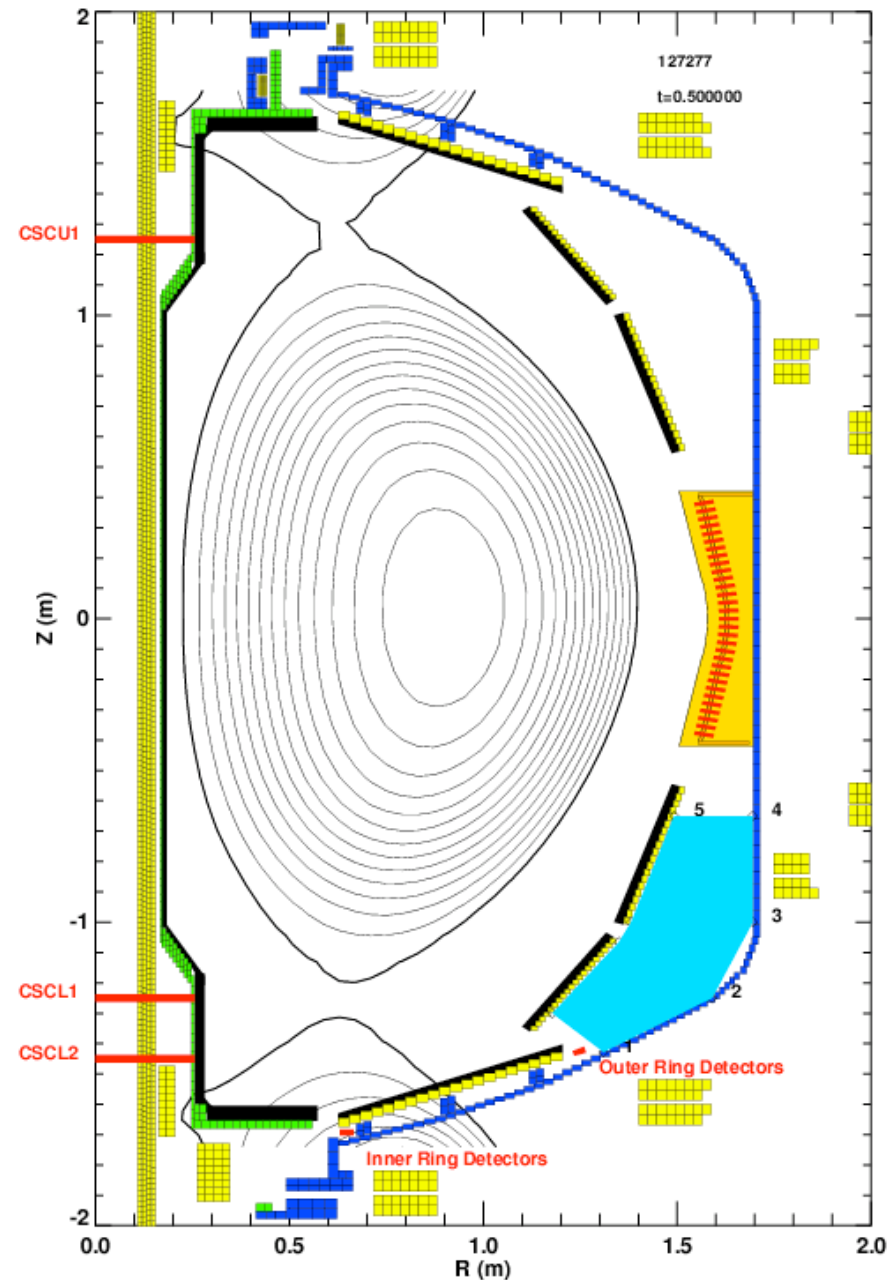
Outer Ring: Just Outside the OBD

Difference Between These: Current into the OBD

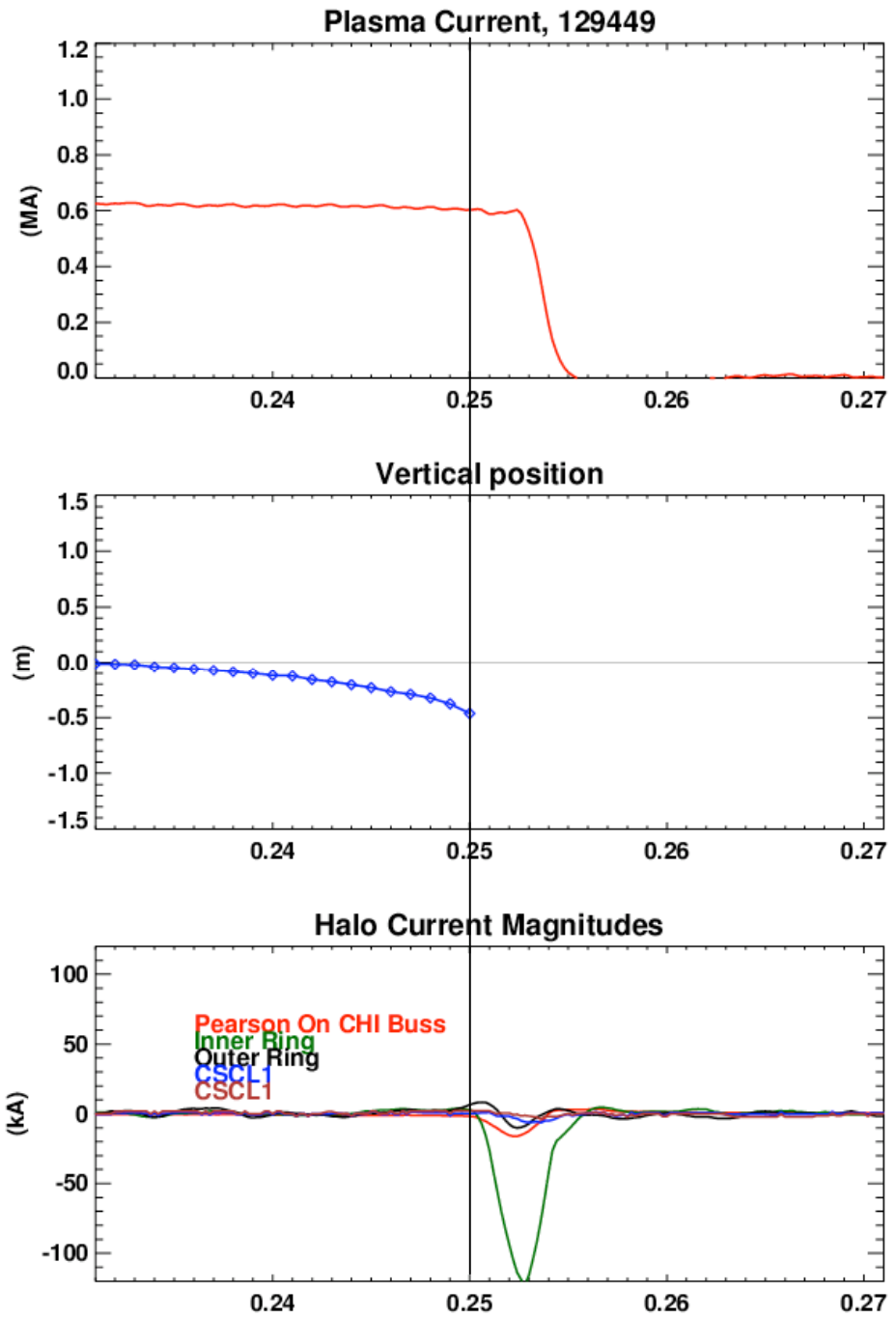
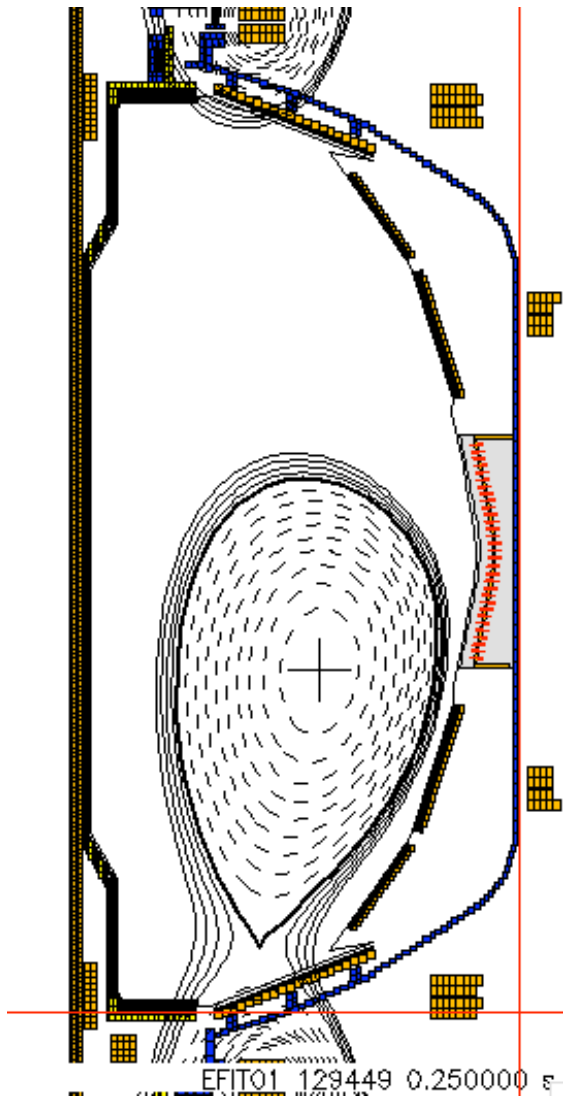
Two Pearson CTs on CHI Bus

Current from inner to outer vessel

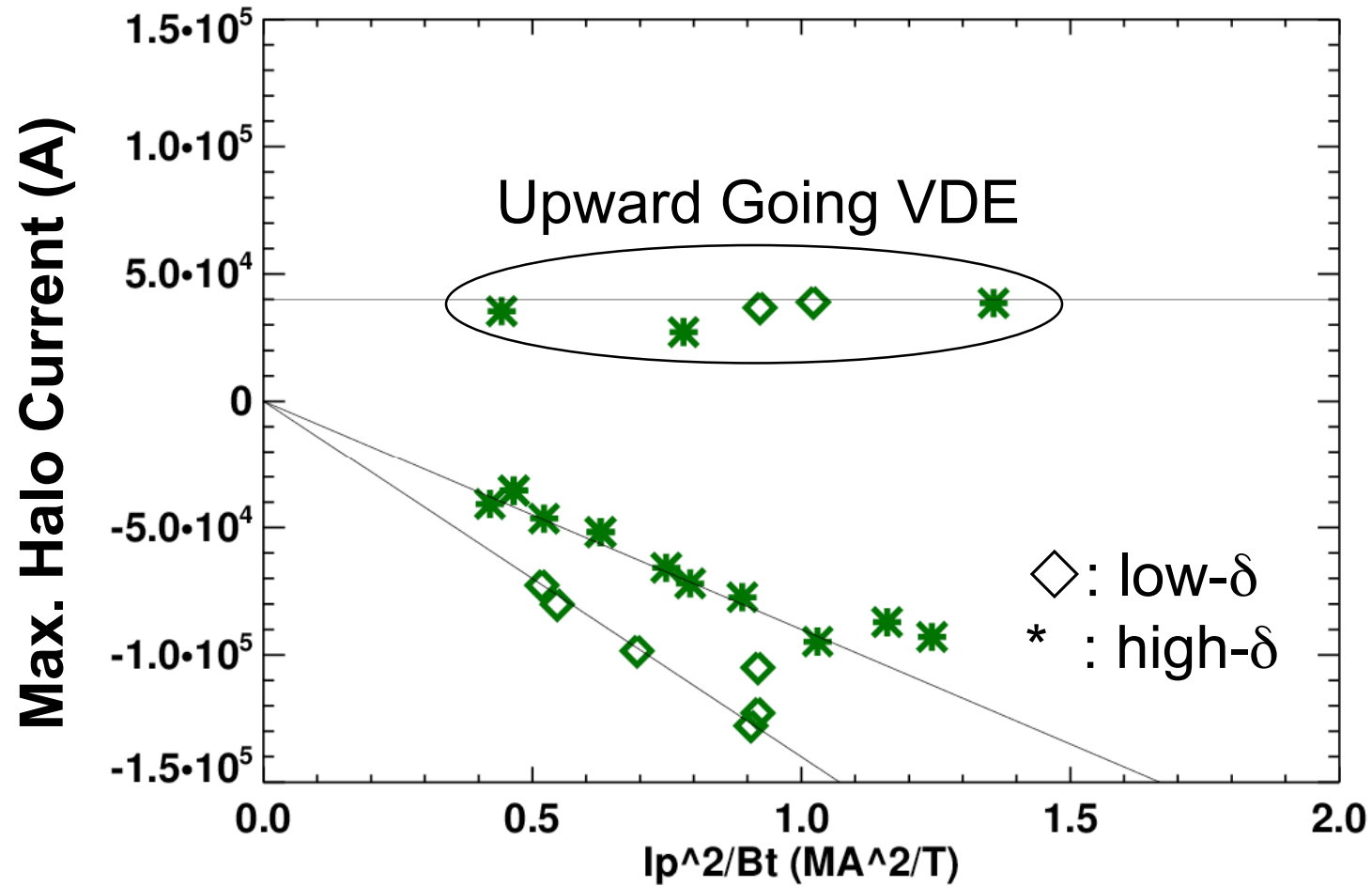
NSTX Is Only Device with this Broken Halo Current Path



Example

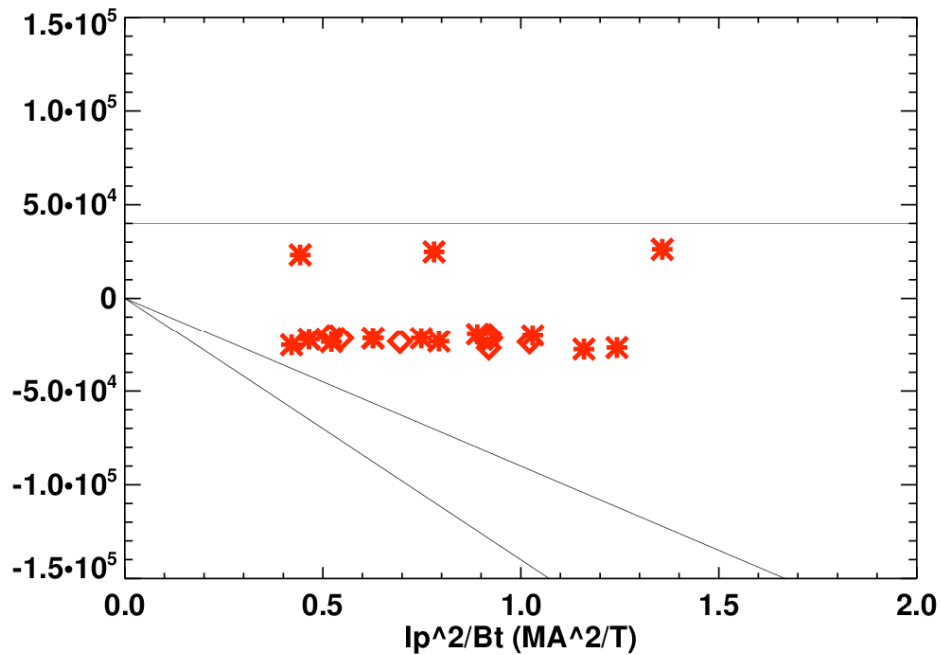


1: Current Linked By Inner Ring

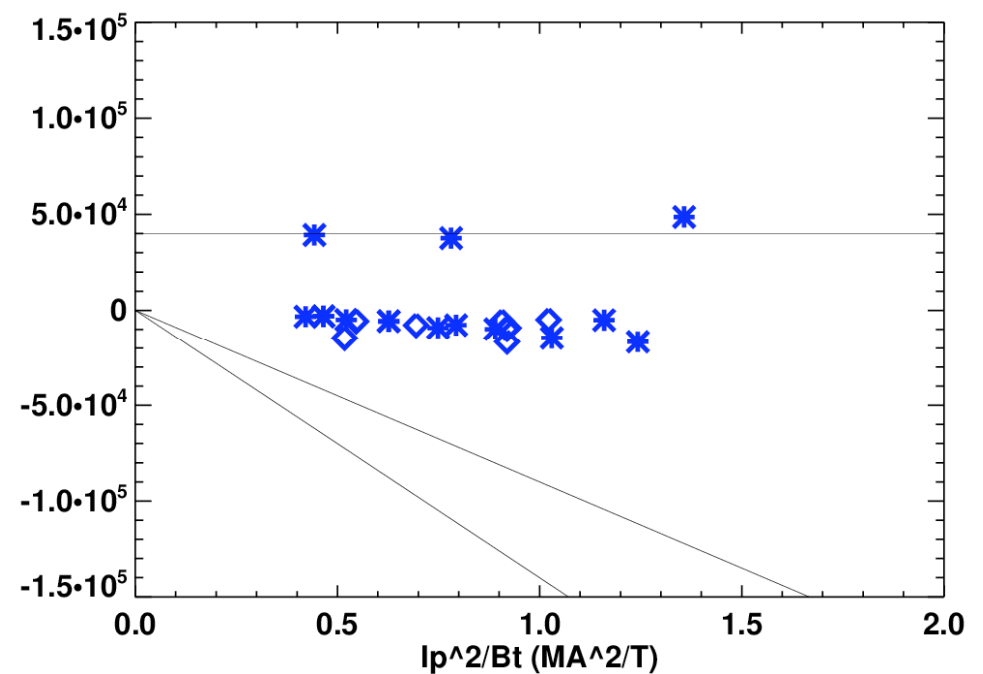


2: Current From Inner to Outer Vessel, PF1A Transition

Inner to Outer Vessel



PF1A Transition



◇ : low- δ
* : high- δ

Compare to All Shots This Year

