Simple as Possible Plasma discharges on NSTX

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Motivation

1) The credo question: Do we understand well the edge plasma physics, core-edge interaction, and diagnostics? If **NO** then start with simplest possible conditions (Stangeby, PSI-15).

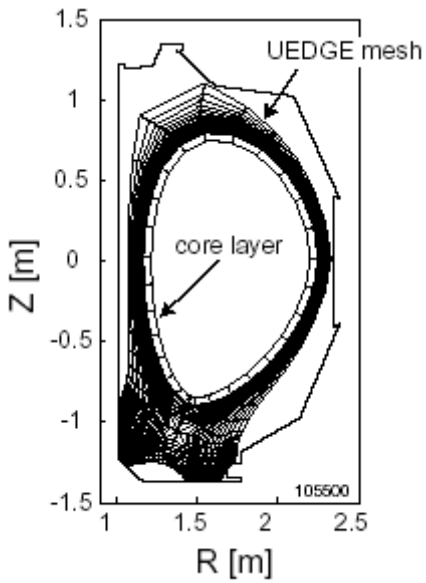
2) Continuing SAPP studies on DIII-D and on C-Mod are very useful.

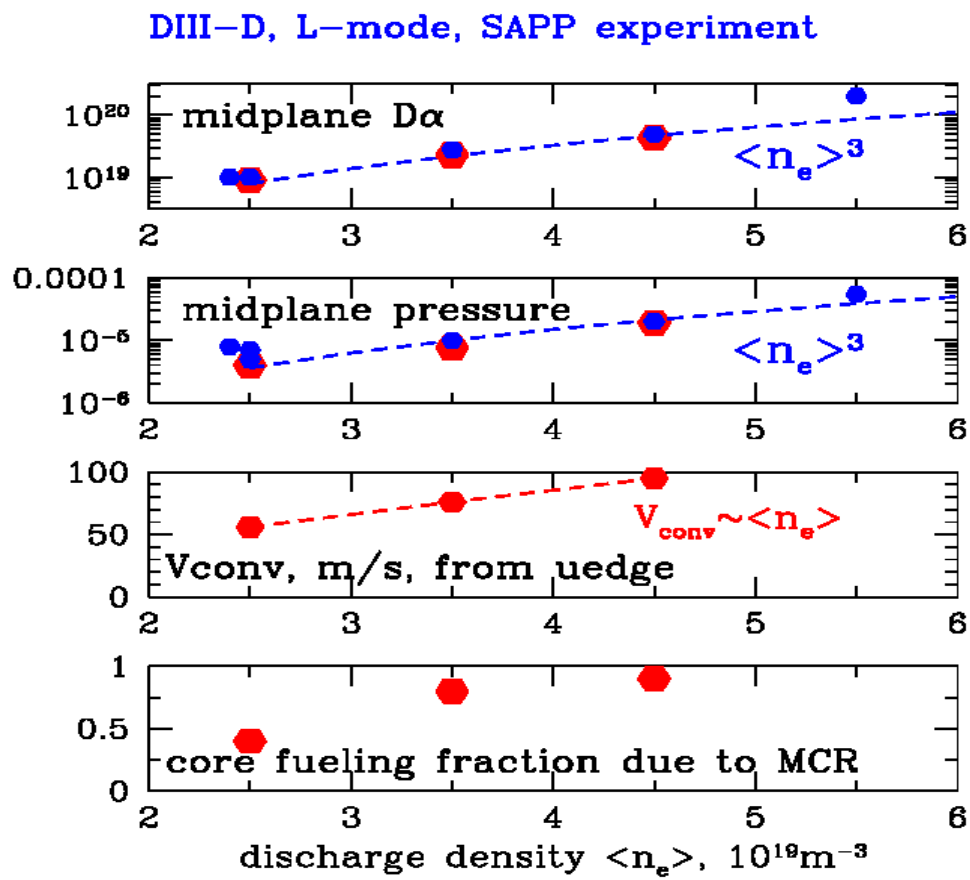
3) Being low-B small-R machine, NSTX already provides unique data on edge transport (in/out asymmetry, high intermittency).

4) Compare and contrast with edge physics codes

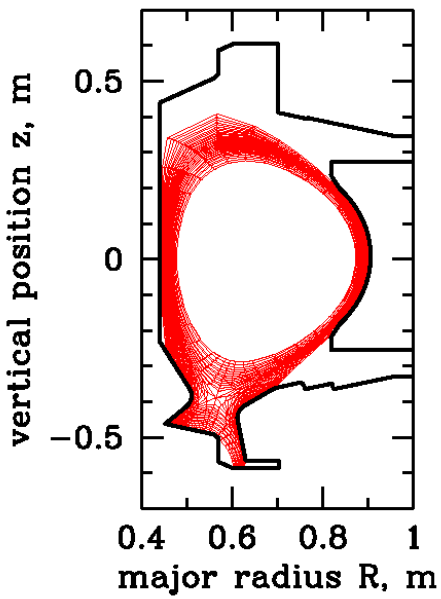
Analysis of SAPP-1 shots on DIII-D gives important scalings for plasma transport and recycling.

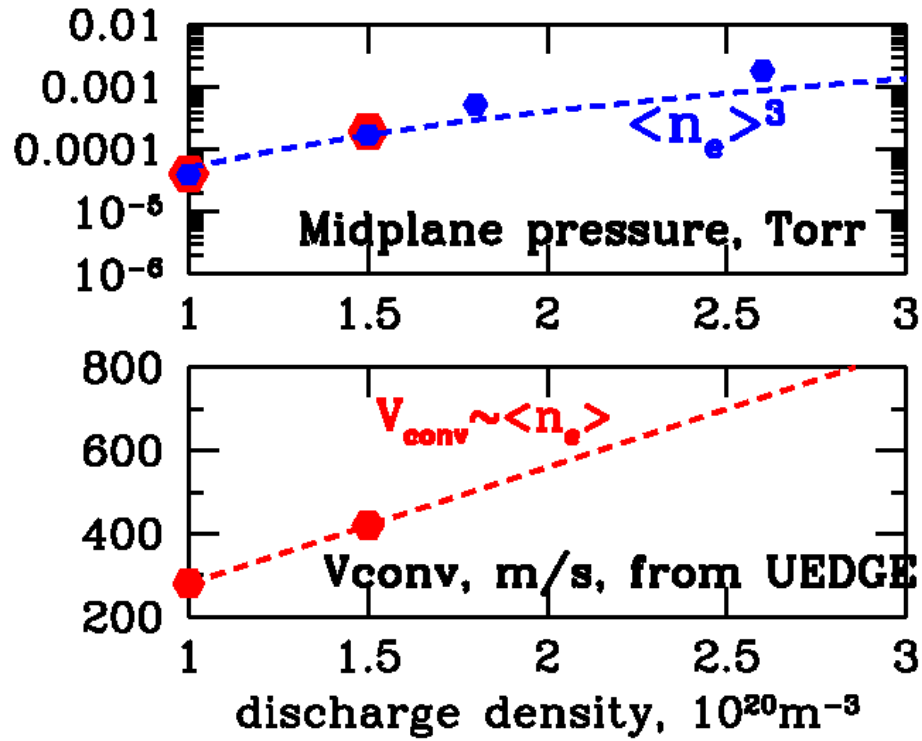
UEDGE analysis shows fast radial convective transport and strong main chamber recycling





Analysis of OH SAPP shots on Alcator C-Mod with UEDGE shows rapid radial convective transport in the far-SOL that increases with discharge density





SAPP shots on NSTX

- L-mode
- OH and modulated low-power NBI
- no divertor detachment at the beginning
- Optimal fueling location (may be outerboard)
- As stationary as possible
- Many repeated shots
- All diagnostics is on

SAPP series

- Scan discharge density, puff rate, inner and outer gaps
- Change input power, divertor configuration, plasma drifts
- Simple plasma may allow density control
- Good for scaling studies and cross-tokamak comparison
- These shots may be repeated or continued anytime (if other experiments failed or new diagnostics is added)
- Good for edge turbulence studies with fast camera imaging and plunging probe