

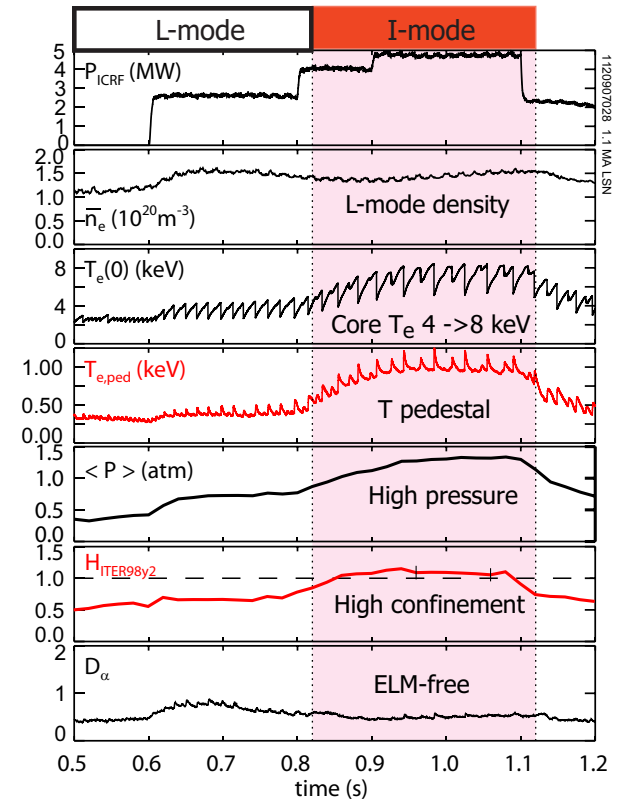
Exploration of I-mode regime on NSTX

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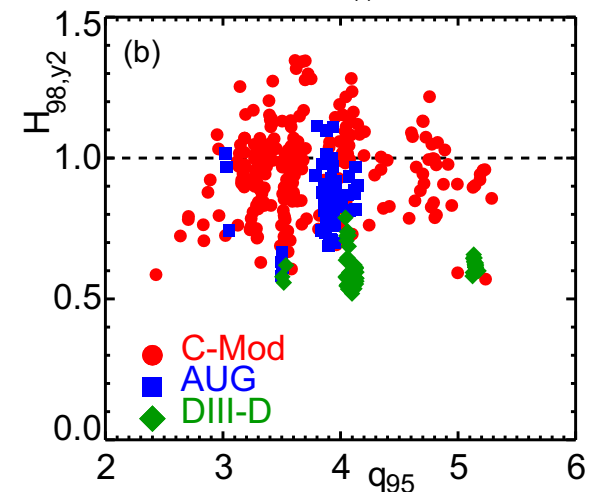
NSTX-U Research Forum February 2015

Background and Aims:

- I-mode regime has L-mode (high) particle transport combined with H-mode (or better) energy transport. Temperature pedestal but no density pedestal. ELM-free.
- Has now been achieved on C-Mod, AUG, DIII-D. Not yet on an ST.
- Accessing on NSTX-U would provide unique information on **thresholds** and **confinement** (size vs B_T vs dimensionless parameters?). Key for extrapolation to ITER, FNSF.
ITPA PEP-31, TC-19.
- Could also be very useful for **particle control**, since regime gives steady, controllable densities in contrast to H-Mode.



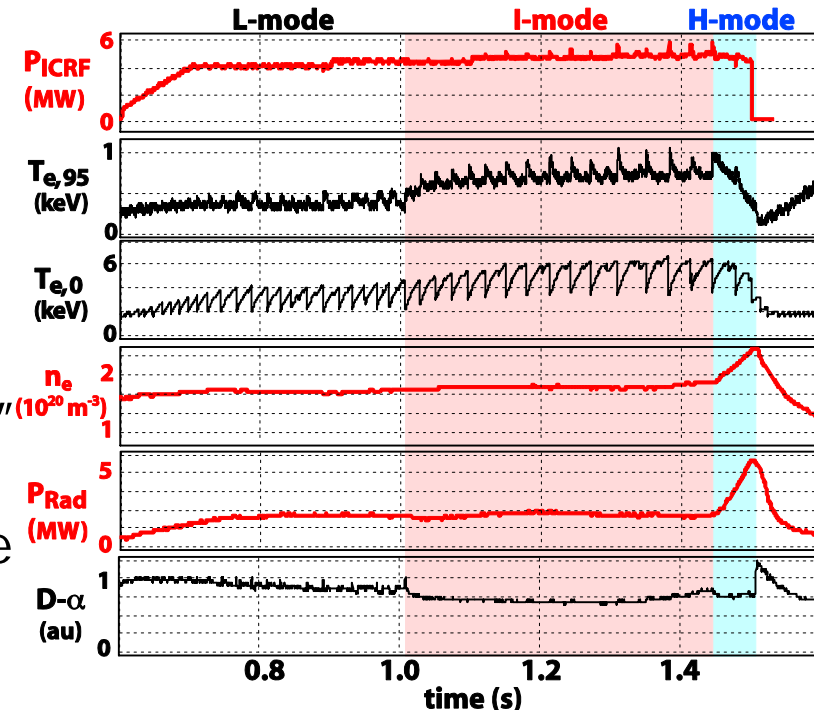
Hubbard
FEC
2012



Hubbard
FEC 2014

Outline of experimental plan

- Establish target plasma in unfavorable drift. Use highest practical B_t and I_p for most clear and robust I-mode.
 - **Given commissioning of NSTX-U, suggest 1 day late FY15 (~0.75 T), 1 day FY16 (~1 T).**
- Slowly step up NBI heating power, in “flat top” phase. Observe the time evolution of edge pedestal – the key signature is T_e rising before n_e . If power is too high, this phase may be transient.
- If this is observed, vary power shot to shot to find level which maintains I-mode in steady state.
- If it is *not*, repeat at lower and higher density.



Note: Plan is similar to NSTX XP 1095, Maingi et al, approved but not run before coil failure.

If robust I-mode regime is obtained, expect follow-up proposals to exploit in Particle Control Task Force, and study pedestal details.