# Compatibility of Radiative Divertor Operation with High Confinement H-mode Plasmas

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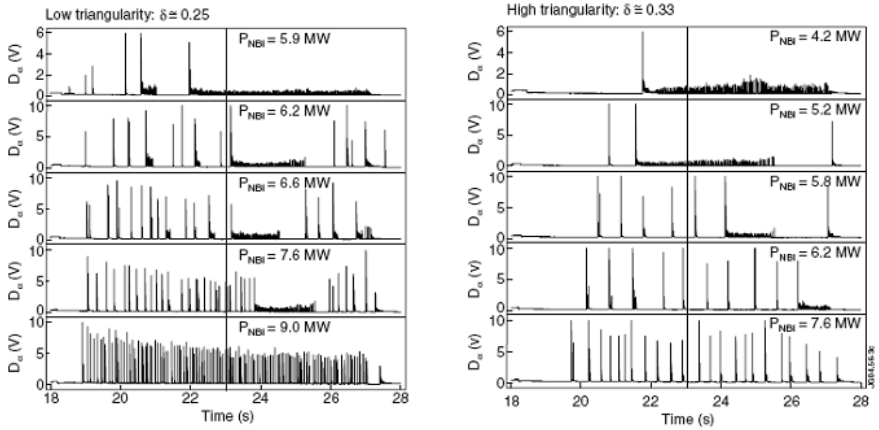
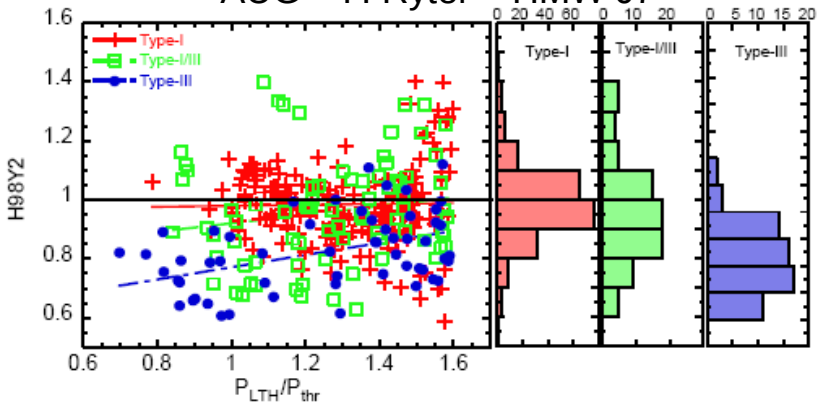
# Compatibility of radiative divertor operation with high confinement H-mode plasmas (I)

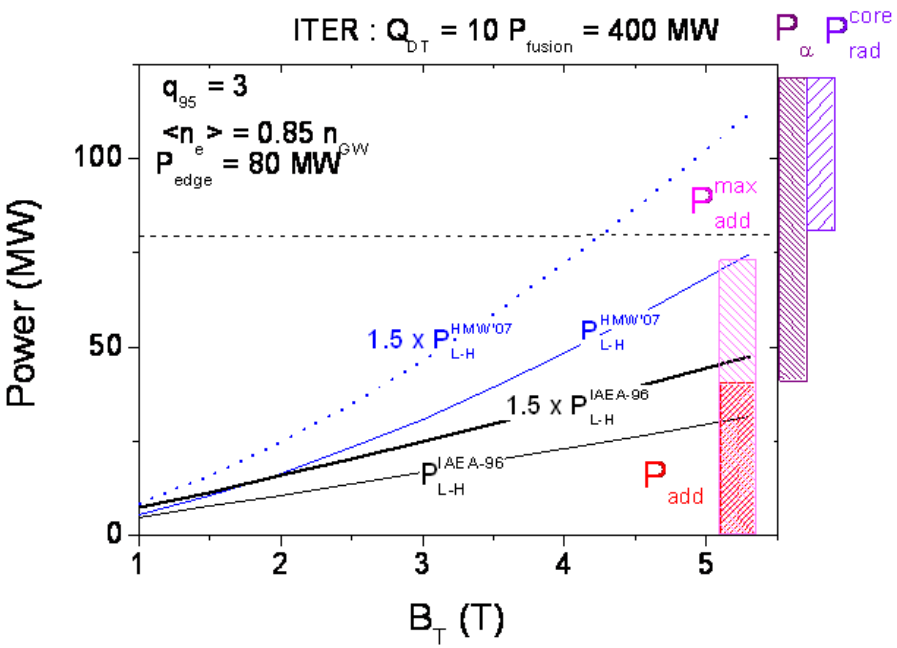
- Power to access good confinement in ITER subject to significant uncertainties :
  - ✓ Additional heating power required to access H-mode (L-H transition)
  - ✓ Margin above L-H transition power to reach H ~ 1 in stationary conditions
  - ✓ Role of core/edge radiation on power requirement
  - ✓ Dynamics of edge power flow evolution following H-mode transition ($P_\alpha$)

JET- Sartori – PPCF 2004




AUG – F. Ryter – HMW'07

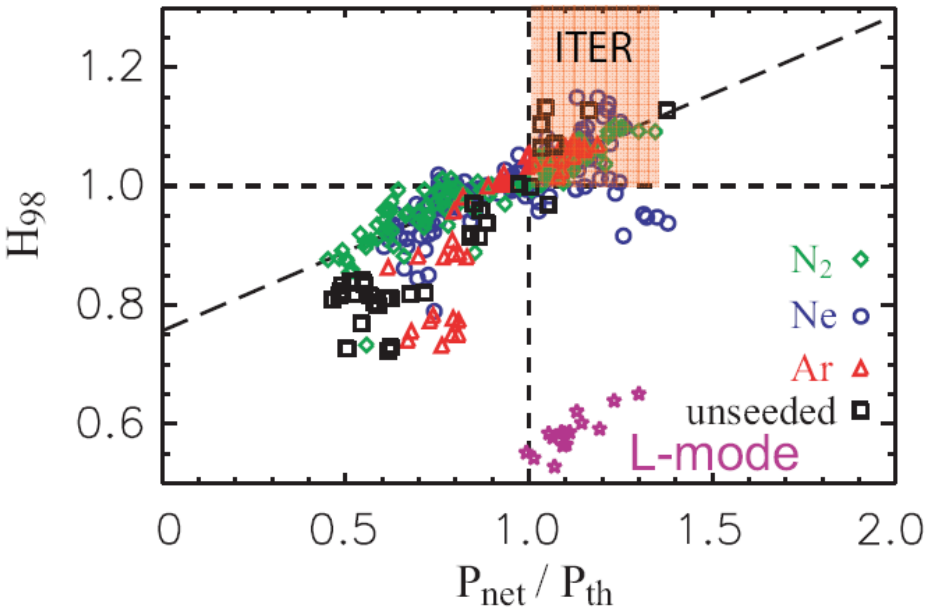


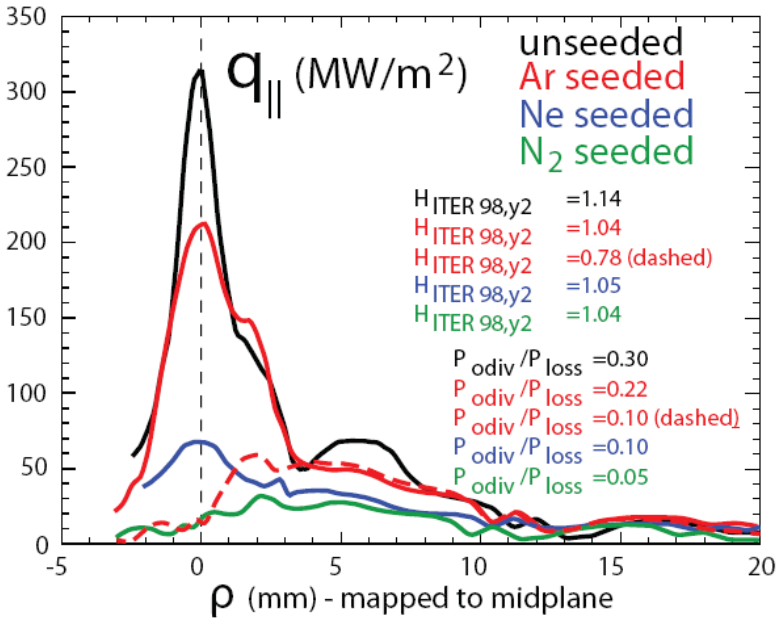



# Compatibility of radiative divertor operation with high confinement H-mode plasmas (II)

- Experiments in C-Mod have demonstrated that plasma confinement is correlated with $P_{net}/P_{th}$ and that high $P_{rad}/P_{loss}$ can be achieved with $H_{98}$ ~ 1 with low Z seeding
- Experiments in C-mod carried out in EDA H-mode → role of ELMs not assessed in experiments
- ELMy H-mode may show larger effect of radiative divertor operation on confinement than EDA H-mode → experiments in NSTX

Reinke PSI'10, Hughes IAEA'10, Loarte APS'10



# Experimental plan

## Plasma conditions in NSTX in ELMy H-mode with large ELMs

1. Establish H-mode at medium $\langle n_e \rangle$ with repetitive Type I ELMs and do a scan of $P_{input}$ in these conditions to determine $H_{98}(P_{net})$
2. Establish radiative divertor with $N_2$ and/or Neon divertor puffing with at least $P_{rad}/P_{loss} > 0.7$ or $P_{div\text{-}out}/P_{loss} < 0.2$
3. Scan $P_{input}$ in radiative divertor conditions to determine $H_{98}(P_{net})$ and $H_{98}(P_{rad}/P_{loss})$ with $N_2$ and/or Neon.
4. Repeat some discharges with high Z impurity seeding (Ar)
5. If time allows repeat experiments at higher/lower $I_p$