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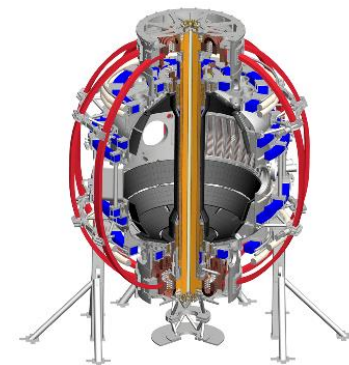
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# Ideas for HL-2A 2017 Run Campaign

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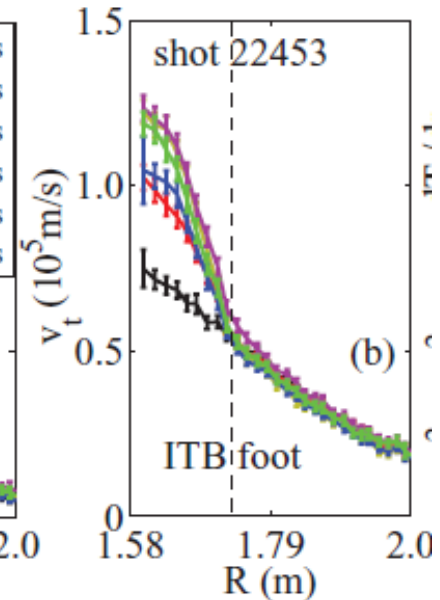
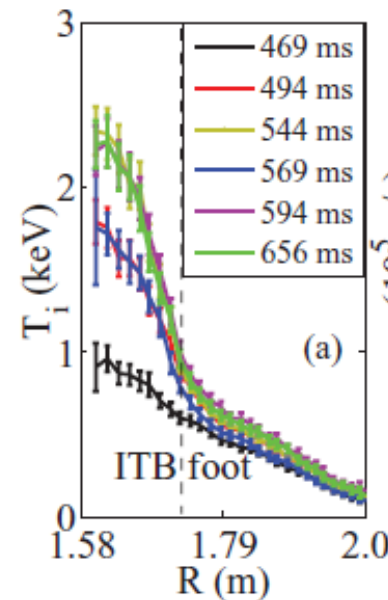
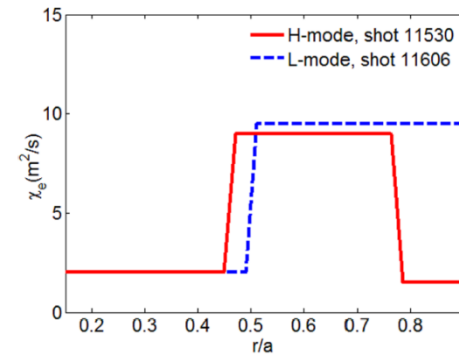
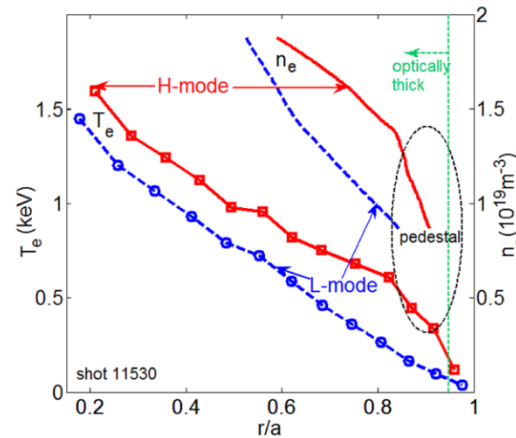
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# Studying Electron Thermal Transport in HL-2A L-mode/ITB Plasmas

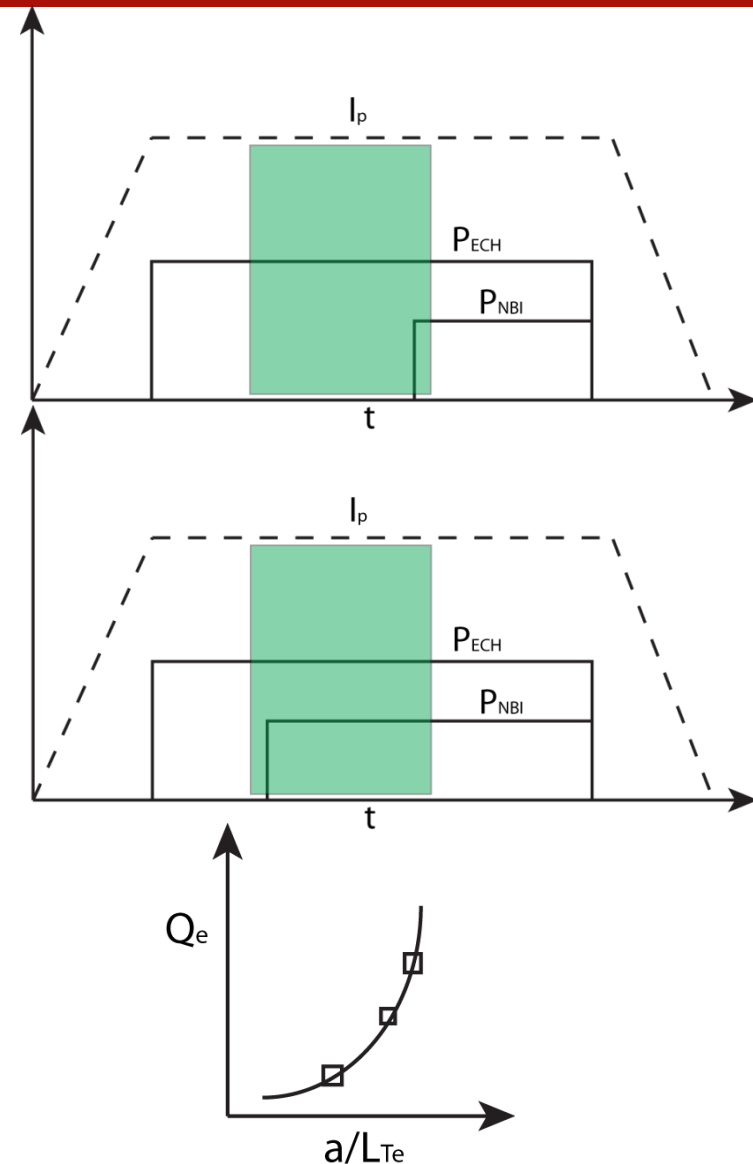
# Background

- Understanding electron thermal transport is important for predicting performance of future fusion devices
- Observed in HL-2A through SMBI modulation experiment (Huang et al., PST, 2013)
  - Electron temperature profile stiffness limits core confinement
- Ion ITB observed in HL-2A with ion thermal transport close to neoclassical
  - Is electron temperature profile stiff?
  - How can we improve electron thermal confinement?



# Studying Electron Thermal Transport in HL-2A L-mode/ITB Plasmas

- ECH power scan in HL-2A L-mode plasmas to determine  $Q_e$  vs  $a/L_{Te}$  (profile stiffness), with NBI turned later for  $T_i$  and  $V_T$  measurements
- Add NBI to assess ExB shear effects on profile stiffness (with ECH power scan) with the same plasma density
- ECH power scan in ITB plasmas to assess  $T_e$  profile stiffness
- Change  $Z_{eff}$  by puffing Neon to assess  $Z_{eff}$  effects on profile stiffness in both L and ITB plasmas
  - ITG /ETG linear threshold has quite strong  $Z_{eff}$  dependence
- Exploiting the comprehensive suite of HL-2A DBS diagnostics to assess ion-scale turbulence vs profile stiffness





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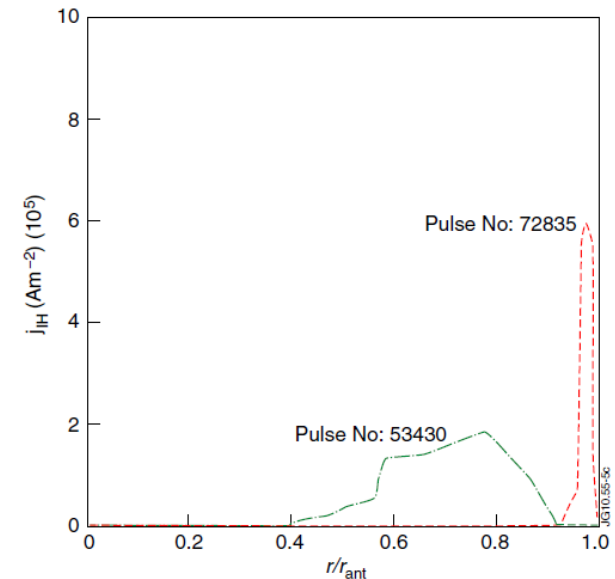
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# **Study of LHCD effects on edge stability in HL-2A H-mode plasmas**

# Background

- Controlling ELM events of H-mode plasmas operation is important for the operation of future fusion devices
- It is widely believed that ELM is due to peeling/ballooning modes
- EAST has reported mitigation effects of LHWs on ELM
  - Attributed to the continuous development of broadband turbulence due to LHWs
- Modification of edge current profile using LHCD could be used to control ELM stability
  - LW edge current drive was demonstrated on JET (Cesario et al., PPCF, 2011)
  - Modification of flow profile is also a possibility (M.F.F. Nave et al., NF, 2016)



# Study of LWCD effects on edge stability in HL-2A H-mode plasmas

- Establish the right condition to have LWCD at plasma edge in ECH/NBI-heated ELMy H-mode plasmas
- Scan LW power to assess the effects of LWCD on ELM stability
- Scan LWCD location to assess the effects of LWCD on ELM stability
- Profile diagnostics ( $T_i$ ,  $V_T$ ,  $T_e$ ) and turbulence diagnostics

