Light impurity transport experiments on Alcator C-Mod

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Light impurity transport experiments

- Idea: Measure the impurity particle pinch
- Contributors: Bill Rowan, Igor Bespamyatnov, Catherine Fiore, Bob Granetz, Ken Gentle, Ken Liao, John Rice
- Topical Area: Transport
- Motivation
  - Impurity peaking leads to fuel dilution, enhanced energy loss
  - Light impurity profiles in C-Mod can be hollow, peaked, or flat. => There is a pinch, and it changes direction
  - Predictions: neoclassical and turbulent transport
  - Diagnostic is improved => better resolution of hollow profiles
- Measure the pinch in H-mode and ITB discharges
  Add context: available turbulence measurements, comparison to heavy impurities, E_r & linear stability analysis

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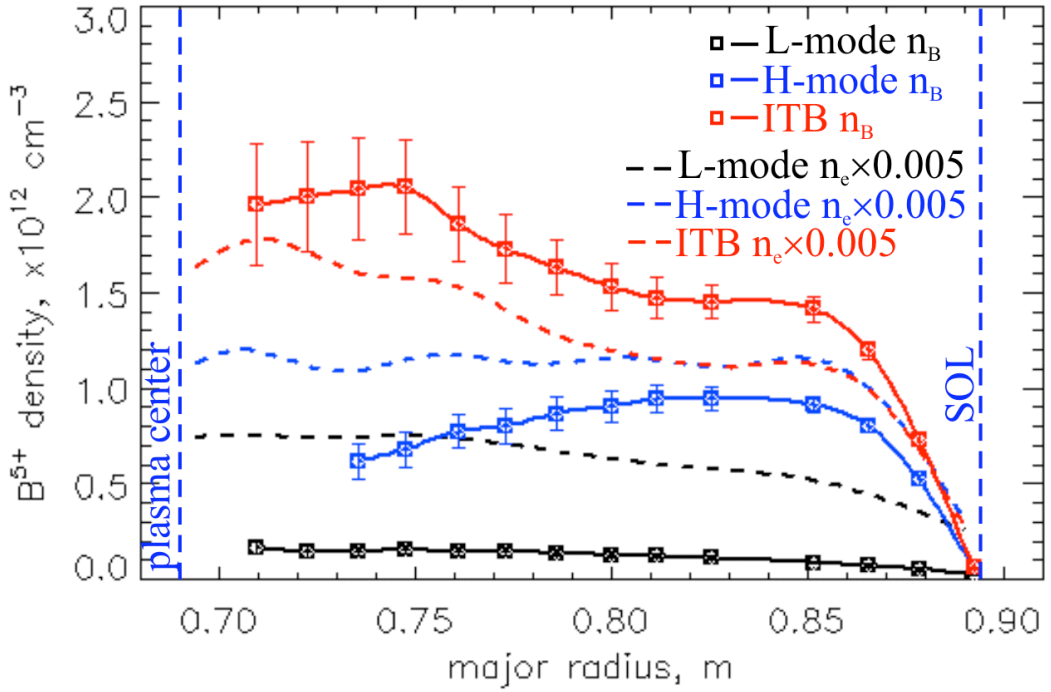
Light impurity transport experiments

- **Peaked profiles were measured in ITB, hollow profiles in H-mode. Verify that the hollow profiles really exist using more accurate diagnostic technique. Verify that inward and outward pinches or convections are observed.**



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Light impurity transport experiments

- Light impurity peaking in low collisionality H-mode discharges.
  - ν_{eff} ~0.15 for ITER
    Similar scaling in C-Mod for $0.5<\nu_{eff}<1.5$
  - Compare heavy and light impurities.
    (Is this comparison also a tool when turbulence measurements are not available or are limited?)
  - Include E_R and turbulence measurements
  - Requires time. 1 day
- Light impurity pinch in H-mode, L-mode, Ohmic (PB)
- Turbulent pinch vs Ware pinch (PB)
  - Use CD to remove or reduce the Ware pinch
  - Does the main ion gradient act through the neoclassical pinch to drive impurity peaking? ITB discharges and vary fueling ion charge (He and D)
- Shear stabilization during ITB discharges (described by Igor)

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