Assessement of Fast Ion Loss Due To Microturbulence

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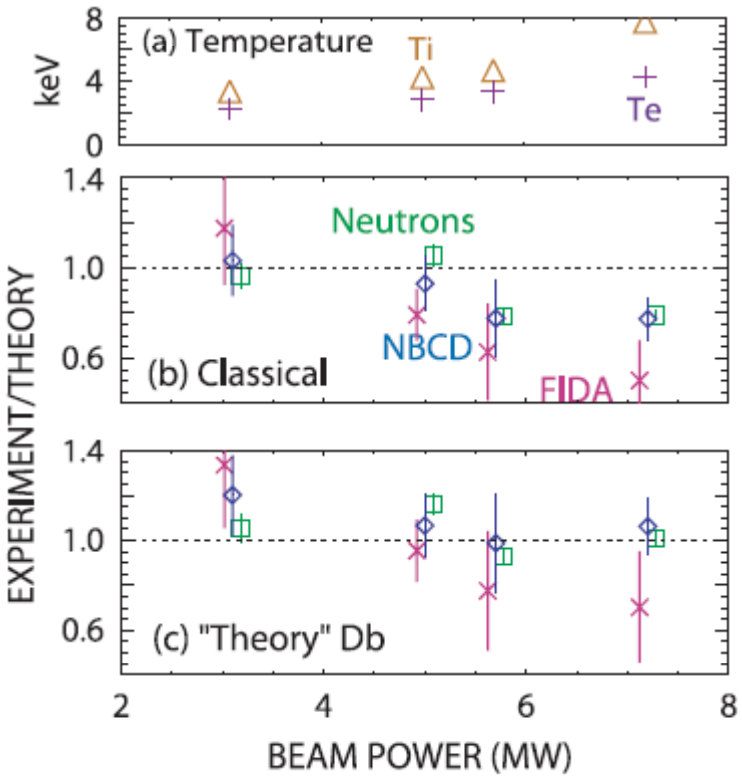

- Fast ions more sensitive to e-s microturbulence at lower W/T
  - DIII-D observations (Heidbrink et al.) indicate more ion loss at higher beam power (higher T) for fixed beam energy
- Does e-m turbulence have similar effect?
- Proposed NSTX experiment
  - Low beta (high B_T): e-s turbulence dominant
    - Compare higher W/T with lower W/T in L- and H-modes
    - High W/T case: 90 keV beams, no HHFW ("low" T_e)
    - Low W/T case: 65 keV beams coupled into pre-heated HHFW plasmas (increase T_e to ~4 keV?)
    - Do in both L-mode and H-mode plasmas
      - Different microturbulence characteristics
  - Repeat in higher beta (low B_t): e-m dominant

Requirements

- Required discharge conditions
  - No fast-ion instabilities or core MHD
  - Steady-state condition for at least 100 ms for adequate FIDA statistics
  - Pretty hot (lower injection energy is an available tool)
  - Good documentation of the microturbulence
- Issues
  - Will W/T ~ 15 low enough to see effect (<10 in DIII-D)?
  - Need to couple NBI and HHFW (and maintain high T_e with NBI)
  - Is fundamental T ion or electron value?
- Diagnostics
  - All turbulence diagnostics
  - FIDAs
  - Profiles, etc.