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P_{LH} for D and He plasmas using RF current drive with symmetric phasing

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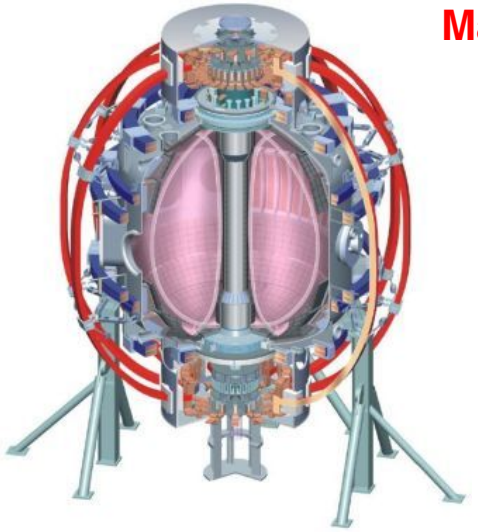

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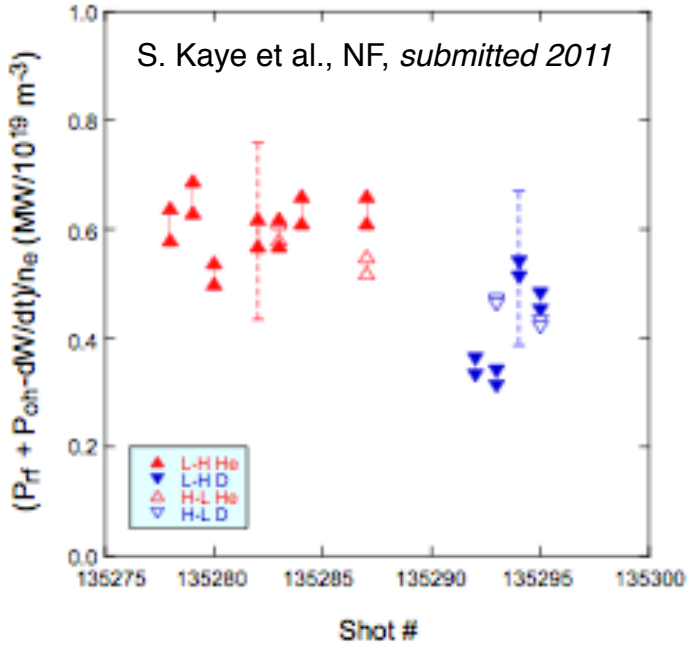
Dependence of P_{LH} on ion species is an ITER priority

- ITPA priority to determine P_{LH} versus ionic species (TC-4)
  - Important for ITER power requirements
  - P_{LH} for He reported to be 1 – 1.8 times larger than D plasmas
  - Difference in power widens at low density



- XP941 suggests minimal difference in P_{LH} in D and He on NSTX
  - RF heating: provided useful tool for P_{heat} scan
  - -90° strap-to-strap phasing had low (~ 20%) power efficiency
    - Led to large error bars in P_{heat} calculation
    - Implies strong SOL heating which may skew interpretation
  - Different dW/dt for the two species

XP1036: Ran with symmetric RF phasing to reduce error bars in P_{LH} calculation

- Use symmetric phasing with higher efficiency
  - Reduces error in P_{RF} and decreases power loss at edge
  - Insert small steps in P_{RF} to measure dW/dt during discharge
  - Try to minimize dW/dt close to transition
  - In 2010: established D discharge, not enough power for He
- Propose 1 day experiment to run D and He plasmas
  - Lesson learned: first establish He LH discharge
    - Over a few shots, replace fraction of LFS He with D, reevaluate P_{LH}
  - Run similar plasmas with D and He
    - Match shape, I_p, B_t, n_e (if possible)
    - Match dW/dt between species
  - Scan RF power to find P_{LH} and P_{HL} similar to XP941
  - Characterize turbulence and SOL flows in low-δ shape with as many diagnostics as possible