The MIT PSFC and collaborators are proposing a new high-field (6.5 tesla), high power density (P/S ~ 1.5 MW/m²) Advanced Divertor eXperiment to perform critical R&D to find a pathway to a DEMO:

1. Demonstrate robust divertor power handling physics solutions, at reactor-level heat fluxes
2. Demonstrate nearly complete suppression of divertor erosion
3. Demonstrate low PMI, efficient, RF current drive and heating technologies that scale to steady-state
4. Achieve 1, 2, 3 with core plasma performance compatible with obtaining a burning plasma

**Background**
- Recent results [1] project to very narrow power exhaust channel widths for ITER and future DEMOs, $\lambda_q \sim 1$ mm. Parallel heat fluxes, $q_\parallel$, scale as
  \[ q_\parallel \sim P_{SOL} B/R \]

  Power exhaust for a DEMO will be 3-4 times higher than ITER, with the additional need to completely suppress divertor erosion. **New divertor solutions are required.**
- Just as important: efficient, low PMI, **RF current drive and heating technologies** that scale to steady state must be developed for a DEMO.

**ADX employs high-field, demountable toroidal field magnet technology of Alcator C-Mod**

**Innovative Divertor Solutions for DEMO**

ADX will test advanced divertor topologies, including **Super-X, X-point Target** long-leg divertor concepts with options for **heated and liquid metal targets**.

**Innovative RF Current Drive/Heating Solutions for DEMO**

ADX will employ high-field-side-launch Lower Hybrid current drive and ICRF systems – for the first time in a diverted tokamak – which project very favorably to high current drive efficiency and dramatically reduced PMI, and develop RF physics/technology at the magnetic fields (6.5T) and densities of a DEMO.