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ADX: A high Power Density, Advanced RF-Driven Divertor Test Tokamak for PMI studies DENNIS WHYTE, MIT PSFC, ADX TEAM — The MIT PSFC and collaborators are proposing an advanced divertor experiment, ADX; a divertor test tokamak dedicated to address critical gaps in plasma-material interactions (PMI) science, and the world fusion research program, on the pathway to FNSF/DEMO. Basic ADX design features are motivated and discussed. In order to assess the widest range of advanced divertor concepts, a large fraction (>50%) of the toroidal field volume is purpose-built with innovative magnetic topology control and flexibility for assessing different surfaces, including liquids. ADX features high B-field (>6 Tesla) and high global power density (P/S $\sim$ 1.5 MW/m^2) in order to access the full range of parallel heat flux and divertor plasma pressures foreseen for reactors, while simultaneously assessing the effect of highly dissipative divertors on core plasma/pedestal. Various options for efficiently achieving high field are being assessed including the use of Alcator technology (cryogenic cooled copper) and high-temperature superconductors. The experimental platform would also explore advanced lower hybrid current drive and ion-cyclotron range of frequency actuators located at the high-field side; a location which is predicted to greatly reduce the PMI effects on the launcher while minimally perturbing the core plasma. The synergistic effects of high-field launchers with high total B on current and flow drive can thus be studied in reactor-relevant boundary plasmas.

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