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ADX: a High Field, High Power Density, Advanced Divertor Test Facility

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The MIT Plasma Science and Fusion Center and collaborators are developing a concept for an advanced divertor experimental test facility (ADX) – a tokamak specifically designed to address critical gaps in the world fusion research program on the pathway to DEMO. This high field (6.5 tesla, 1.5 MA), high power density ($P/S \sim 1.5 \text{ MW/m}^2$) facility will test innovative divertor concepts for next-step DT fusion devices (FNSF, DEMO) at reactor-level boundary plasma pressures and parallel heat flux densities while producing reactor-relevant core plasma conditions. The experimental platform will also test advanced lower hybrid current drive (LHCD) and ion-cyclotron range of frequency (ICRF) actuators at the plasma densities and magnetic field strengths of a DEMO, with the unique ability to deploy launcher structures both on the low-magnetic-field side and the high-field side – a location where energetic plasma-material interactions can be more easily controlled and reduced. This innovative experiment will perform plasma science and technology R&D necessary to inform the conceptual development and accelerate the readiness-for-deployment of next generation DT fusion devices – in a timely manner, on a flexible, reconfigurable research platform.

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