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Design of PPPL's tabletop permanent magnet stellarator

CARLOS CATALANO, University of Puerto Rico at Mayaguez, ARTURO DOMINGUEZ, MIKE ZARNSTORFF, Princeton Plasma Physics Lab — One of the leading magnetic plasma confinement configurations is the stellarator. With its unique non-symmetric shape, it provides a confining magnetic field without requiring plasma current. This reduces instabilities (vs. tokamaks) and can confine fusion relevant plasmas. Current stellarators are built using irregularly shaped coils, which represent a challenge in design and manufacturing. PPPL, in collaboration with the Simons Foundation, is working on a new concept involving the use of permanent magnets for a fusion relevant stellarator experiment. In this poster we present the design of a PPPL tabletop stellarator, which tests the permanent magnet technology at a small scale. The purpose of this device is to showcase the innovative permanent magnet stellarator in a simplified and transportable fashion while keeping the cost and construction time low. We envision this device to be portable enough to serve as an outreach platform to highlight the magnetic confinement configuration, while versatile enough to be used to study flux surfaces with different magnetic field geometries and strengths.

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