

Abstract Submitted
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Design and Initial Results from a Table-Top Stellarator with Permanent Magnets TONY QIAN, ARTURO DOMINGUEZ, PPPL, PIERRE GOURDAIN, University of Rochester, CHRIS PAGANO, CHIRAG RANA, MICHAEL ZARNSTORFF, CAO XIANG ZHU, PPPL — MUSE is a table-top stellarator with planar coils and permanent magnets (PM), optimized to be Quasi-Axisymmetric (QAS) for good particle confinement. Recent research shows it is possible to produce 3D fields using planar coils and a simple array of permanent magnets [1]. The SAS study at PPPL has applied these principles to design a half-tesla QAS stellarator using permanent magnets and the original TF coils and VV from NCSX [2]. MUSE uses the same principles to make a R=0.3m B=0.15T QAS stellarator with water-jet cut and 3D-printed materials for low-cost and relatively simple construction. This poster will present methods for permanent magnet optimization using existing codes including REGCOIL and FAMUS, compare multiple Quasi-Axisymmetric target configurations, and outline plans for electron beam mapping of flux surfaces and initial plasma experiments. [1] P. Helander, M. Drevlak, M. Zarnstorff, and S. Cowley, Phys. Rev. Lett. 124, 095001 (2020). [2] C. Zhu, M. Zarnstorff, D. Gates, and A. Brooks, 2020 Nucl. Fusion 60 076016 (2020).

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