

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

A Tunable Sheared Elliptical Solenoid for Precision Neutron Beam Experiments DAVID BOWLES, University of Kentucky, UTK NEUTRON OSCILLATION GROUP TEAM — Because of the neutron's neutrality, many fundamental symmetries experiments instead exploit its magnetic moment and use precise magnetic fields to manipulate neutron beams. One implementation requirement of experimental searches for beyond Standard Model sterile (mirror) neutron oscillations is a ~ 10 G magnetic field, tunable to arbitrary directions, and maintaining a uniformity to ~ 2 mG. I will present a symmetric design involving a series of three sheared elliptical solenoids layered and rotated by $2\pi/3$ with respect to each other, which can produce both uniform solenoidal and transverse magnetic fields. The three coils can be tuned not only to produce an arbitrary field in any direction, but also to actively compensate for small variations in background fields along the beam axis. These nonstandard wire geometries have been fully realized using 3D printing technology.

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Date submitted: 11 Jan 2021

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