Abstract Submitted
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The cos-theta coil re-re-visited[1] CHRISTOPHER CRAWFORD, University of Kentucky / Arizona State University — Precision measurement of symmetry violating effects such the electric dipole moment (EDM) of fundamental particles requires extremely uniform fields. The cos-theta coil is the standard workhorse for generating uniform transverse magnetic fields in these experiments. Limitations in field uniformity include fringe effects (finite length), discretization (finite number of wires), and construction tolerance (finite resources). The field can be isolated from its environment by superposition of two coaxial cos-theta coils of different radii and opposite magnetic moment (double-cos-theta coil), or by shielding the coil inside a permeable or superconducting cylinder. I will discuss methods for optimizing the field uniformity of a compact cos-theta coil, and compare the ultimate limit on errors due to each source described above. Within the context of the scalar potential, I will show a straightforward generalization to non-circular coils with z- or ϕ-symmetry.

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