



PHYSICS AND ASTRONOMY COLLOQUIUM

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**“A tabletop-scale probe for TeV
physics: the electric dipole
moment of the electron”**

Abstract

Time-reversal (T) symmetry is observed to be broken in K- and B-meson systems, in a manner consistent with the Standard Model (SM) of electroweak interactions. Violation of T-invariance makes it possible for elementary particles such as the electron to have an electric dipole moment (EDM) along their spin axis. Although the SM prediction for the electron EDM is too small to detect, extensions to the SM frequently predict EDMs within a few orders of magnitude of the current limits. I will describe our ACME experiment, which uses methods of atomic and molecular physics to detect the electron's EDM. We recently completed the most sensitive search for this quantity, finding a result consistent with zero but setting a limit an order of magnitude smaller than previous work. Remarkably, the result of this tabletop-scale experiment sets strong constraints on the existence of T-violating phenomena well above the TeV scale being probed at the Large Hadron Collider, and has a substantial impact on theories of physics beyond the Standard Model.

Wednesday, October 17, 2018

3:30 p.m.

Bob Wright Centre Building

Room A104