



## Physics Division Seminar

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### **A Quantum-Enabled Probe of TeV Physics: Searching for the Electric Dipole Moment of the Electron**

Host: Peter Mueller

**Wednesday, October 3, 2018 – 203, R150, 3:30 PM**

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 a quantum-enabled measurement technique to detect the electron's EDM. We very 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, and has a substantial impact on theories of physics beyond the Standard Model.