

Abstract Submitted  
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**Effects of a PID Control System on Electromagnetic Fields in an nEDM Experiment** DANIEL MOLINA, Caltech — The Kellogg Radiation Laboratory is currently testing a prototype for an experiment that hopes to identify the electric dipole moment of the neutron. As part of this testing, we have developed a PID (proportional, integral, derivative) feedback system that uses large coils to fix the value of local external magnetic fields, up to linear gradients. PID algorithms compare the current value to a set-point and use the integral and derivative of the field with respect to the set-point to maintain constant fields. We have also developed a method for zeroing linear gradients within the experimental apparatus. In order to determine the performance of the PID algorithm, measurements of both the internal and external fields were obtained with and without the algorithm running, and these results were compared for noise and time stability. We have seen that the PID algorithm can reduce the effect of disturbance to the field by a factor of 10.

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