## Abstract Submitted for the DNP10 Meeting of The American Physical Society

Geant4 Simulations for the Radon Electric Dipole Moment Search at TRIUMF EVAN RAND, JACK BANGAY, LAURA BIANCO, RYAN DUNLOP, PAUL FINLAY, PAUL GARRETT, KYLE LEACH, ANDREW PHILLIPS, CARL SVENSSON, CHANDANA SUMITHRARACHCHI, JAMES WONG, The University of Guelph — The existence of a permanent electric dipole moment (EDM) requires the violation of time-reversal symmetry (T) or, equivalently, the violation of charge conjugation C and parity P (CP). Although no particle EDM has yet been found, current theories beyond the Standard Model, e.g. multiple-Higgs theories, left-right symmetry, and supersymmetry, predict EDMs within current experimental reach. In fact, present limits on the EDMs of the neutron, electron and <sup>199</sup>Hg atom have significantly reduced the parameter spaces of these models. The measurement of a non-zero EDM would be a direct measurement of the violation of time-reversal symmetry, and would represent a clear signal of new physics beyond the Standard Model. Recent theoretical calculations predict large enhancements in the atomic EDMs for atoms with octupole-deformed nuclei, making odd-A Rn isotopes prime candidates for the EDM search. The Geant4 simulations presented here are essential for the development towards an EDM measurement. They provide an accurate description of  $\gamma$ -ray scattering and backgrounds in the experimental apparatus, and are being used to study the overall sensitivity of the RnEDM experiment at TRIUMF in Vancouver, B.C.

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