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Investigation of the E2 and E3 matrix elements in ^{200}Hg using direct nuclear reactions[1] EVAN RAND, VINZENZ BILDSTEIN, ALEJANDRA DIAZ VARELA, PAUL GARRETT, BAHARAK HADINIA, DREW JAMIESON, BADAMSAMBUU JIGMEDDORJ, ALEX LAFFOLEY, KYLE LEACH, ANDREW MACLEAN, CARL SVENSSON, The University of Guelph, GORDON BALL, TRIUMF, THOMAS FAESTERMANN, Technische Universität München, RALF HERTENBERGER, HANS-FRIEDRICH WIRTH, Ludwig-Maximilians-Universität München — To date, ^{199}Hg provides the most stringent limit on an atomic electric dipole moment (EDM). The existence of a permanent EDM would be a clear signal of CP violation from new physics beyond the Standard Model. Theoretical nuclear-structure calculations for ^{199}Hg are challenging, and give varied predictions for the excited-state spectrum. Understanding the E2 and E3 strengths in ^{198,199,200}Hg will make it possible to develop a nuclear structure model for the Schiff strength based on these matrix elements, and thereby constrain present models that predict the contribution of octupole collectivity to the Schiff moment of the nucleus. This work comprises two experiments using the Q3D magnetic spectrograph at the Maier-Leibnitz Laboratory. These experiments utilized a 22 MeV deuteron beam incident on a target of ^{200}Hg^{32}S. The first experiment accesses the E2 and E3 matrix elements in ^{200}Hg via inelastic deuteron scattering. The second experiment, ^{200}Hg$(d,t)^{199}$Hg, yields important information on the single-particle nature of ^{199}Hg. Preliminary results will be presented.

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