Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **4470** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) STUDIES OF 198Hg(d, d') INELASTIC SCATTERING REACTION

Monday 27 May 2024 11:00 (15 minutes)

Motivated by fundamental symmetry tests, a measure of large electric dipole moment (EDM) would represent a clear signal of the violation of the CP symmetries. This observation highlights the imbalance in the matter and antimatter observed in our Universe. Since the best theory for particle physics: the Standard Model (SM) of particles predicts an EDM lower (10^{-30}) than the experimental reach, it is necessary to explore physics beyond the SM, models at the nucleus level such as Schiff moment theoretical model that predicts more accurate EDM. The strengths E2 and E3 that connect the ground state of ^{199}Hg to its excited state are useful to obtain EDM which in comparison to other species previously measured, provides one of the most precise upper limits on an atomic EDM (order of 10^{-28}). Performing an experiment for ^{199}Hg is very challenging. As such, several experiments on ^{198}Hg and ^{200}Hg at the Maier-Leibnitz Laboratorium of the Ludwig-Maximilians Universität München have been conducted. To extract matrix elements E2 and E3 for 198Hg from the data collected, a deuteron beam bombarded the target of the compound of $^{198}Hg^{32}S$ producing scattering particles that were separated and detected using the quadruple three-dipole (Q3D) magnetic spectrograph. Very high-statistics data sets were collected from this reaction, resulting in considerable new states, angular distributions, therefore spin and parities assignments for new states, and cross sections. We also provide additional insight into the distribution of the matrix elements of ^{199}Hg.

Details of the analysis of the $^{198}Hg(d, d')$ reaction to date will be given.

Keyword-1

Q3D

Keyword-2

198Hg+d reaction

Keyword-3

Author: VALBUENA, Sally (University of Guelph)

Co-authors: RAND, Evan (University of Guelph); GARRETT, Paul. E (Department of Physics, University of Guelph); BILDSTEIN, Vinzenz (Department of Physics, University of Guelph)

Presenter: VALBUENA, Sally (University of Guelph)

Session Classification: (DNP) M1-4 Nuclear Structure I | Structure nucléaire I (DPN)

Track Classification: Technical Sessions / Sessions techniques: Nuclear Physics / Physique nucléaire (DNP-DPN)