JESSICA
BELLONE

THEORETICAL MODELLING OF HEAVY ION DOUBLE CHARGE EXCHANGE REACTIONS AND CALCULATIONS FOR THE NUMEN PROJECT

Double charge exchange reactions induced by Heavy Ions (HIDCE) are actracting a lot of interest in the last decade, due to their multipurpose nature. In particular, the existence of features common to HIDCE reactions and the elusive neutrino-less double beta decay (0νββ), could make the former a tool to get data-driven information on the nuclear matrix element (NME) of this beyond Standard Model decay. An accurate determination of such NME is crucial for extracting meaningful information on neutrino effective mass, from possible 0νββ decay rate measurements. Hitherto theoretical models offer 0νββ NME values spanning by about a factor of 3. In this regard, the NUMEN project developed at INFN-LNS, in Catania, aims at inferring data-driven constraints on 0νββ NME from HIDCE cross-section measurements. The present seminar illustrates the formalism underlying HIDCE reactions, described as two-step processes and in particular as double single charge exchange (DSCE) reactions. DSCE cross-section is determined within second order DWBA formalism. It will be shown that a proper treatment of the nuclear transition densities allows to directly relate DSCE cross section to the product of projectile and target DSCE nuclear matrix elements, this representing a first step towards data-driven information on these NMEs. Calculations will be shown for some of the nuclear reactions studied within the NUMEN collaboration.

ESPRESSO SEMINARS

6 DICEMBRE 2023 | ORE 15:00

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