

Heavy Ion charge exchange reactions and the link with beta decay processes

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There is recently renewed interest in the study of single and double charge exchange reactions with heavy ions. We report here a preliminary theoretical study of double charge exchange (DCE) reactions in terms of two successive charge exchanges (SCE) in second order Distorted Wave Born approximation.

We look in particular at the conditions where the corresponding cross section can be factorized into nuclear reaction and structure terms, showing that in this case one can establish a connection with two neutrino double beta decay. The possibility of a correlated DCE process, that should exhibit a closer analogy with neutrinoless double beta decay, is also discussed.

The role of competing transfer mechanisms is investigated. Theoretical estimates indicate that the charge exchange process is dominant.

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