

Cyclotron Colloquium, Tuesday, November 9th, at 3:45 pm

2p-2p decay in ^8C and other 2p decay cases in light nuclei

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Abstract

Recent technical advances have allowed for high-order correlation experiments to be done. We have primarily focused on experiments in which the final channel is composed of only alphas and protons. Three cases we have studied are: ^6Be , ^{10}C and ^8C via 3, 4, and 5-particle correlation experiments respectively. While the first case had been studied before, our work presents very high statistics in the full Jacobi coordinates (the coordinates needed to describe 3-body decay.) Our study of ^{10}C provides an isolatable example of correlated 2p decay. Our most recent work, on ^8C , presents the only case of sequential 3-body decay steps (i.e. 2p-2p.) The intermediate in this 2-step process is the first example (^6Be) mentioned above. Unlike the well studied second step (the decay of ^6Be), the first step in this 2p-2p process also provides an example of correlated 2p emission. In this experiment we also found the first case of 2p decay from an isobaric analog state to an isobaric analog state, $^8\text{B}(\text{IAS}) \rightarrow ^6\text{Li}(\text{IAS}) + 2\text{p}$. This is a case for which 1p decay is energetically allowed but isospin forbidden. This represents an expansion, over that originally envisioned by Goldanski, of the conceivable nuclear territory for 2p decay.