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Investigations of multi-particle exit channels of levels in light nuclei J.J. MANFREDI, R.J. CHARITY, J.M. ELSON, R. SHANE, L.G. SOBOTKA, Washington University, Z. CHAJECKI, D. COUPLAND, H. IWASAKI, M. KIL-BURN, J. LEE, W.G. LYNCH, A. SANETULLAEV, M.B. TSANG, J. WINKEL-BAUER, M. YOUNGS, National Superconducting Cyclotron Laboratory and Michigan State University, S.T. MARLEY, D.V. SHETTY, A.H. WUOSMAA, Western Michigan University, T.K. GHOSH, Variable Energy Cyclotron Centre, M.E. HOWARD, Rutgers University, HIRA COLLABORATION — The HiRA array was used to study the many-particle exit channels produced from the interactions of an E/A = 70 MeV ⁹C beam with a ⁹Be target. Correlations between these particles were studied to analyze the decays, particularly whether they occur in one prompt step or sequentially through long-lived intermediates. The five-body decay of ${}^{8}C$ is found to occur in two steps of two proton decay through a ⁶Be ground-state. In the first step, the correlations between the protons clearly show the enhanced diproton character of the decay, and the second step was found to be consistent with the independently measured ^{6}Be two-proton decay. A new mass and uncertainty for 8 C were deduced from these data and used in a refit of the A = 8 data to the isobaric multiplet mass equation (IMME). The fit indicates the need for terms beyond quadratic meaning that isospin symmetry is clearly broken for the A = 8 multiplet.

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