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Breakup of the 18.2 MeV state in 11Be: New decay modes.

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The ^{11}Li β-decay offers a unique window to understand the nuclear structure far beyond the valley of stability. The β-delayed charged particle emission of ^{11}Li has been the subject of several previous studies [1-4]. The established channels involve the emission α particles (2α+3n), ^{6}He (^{6}He+α+n), tritons (^{8}Li+t), deuterons (^{9}Li+d) and the emission of 1n and 2n feeding the ground states of ^{10}Be and ^{9}Be respectively. The two channels involving α particles were previously studied in a ^{11}Li β-decay coincidence experiment by Langevin et al.[4]. The coincidence charged particle spectrum was explained as due to the breakup of two states in ^{11}Be at 10.6 and 18.2 MeV excitation energy. The breakup of the latter was assumed to ocur by the three body channel nα^{6}He and the 5-body 3n2α. However, a recent ^{11}Li β-decay experiment performed by our collaboration [7] observed structures in the coincidence scatter plot interpreted as the sequential break-up of ^{11}Be through intermediate ^{A}He resonances.

In this work we present the first results of a new ^{11}Li β-decay experiment we performed at ISOLDE to clarify our previous interpretation [7]. The experimental set-up, consisting of 3 DSSSD's, was optimized for maximum solid angle coverage while having good spatial resolution. This improvements allowed us to record five times as many statistics as in the previous experiment, and to obtain direct evidence of sequential three-body, nα^{6}He, break-up of ^{11}Be through the ground state of ^{7}He. Moreover, by reconstructing the neutron energy using energy and momentum conservation, we have identified two new states in ^{11}Be decaying through this new ^{7}He channel at 15.25, 16.18 MeV on top a previously known state at 18.0 MeV.
1] M. Langevin et al., Phys Lett. B146 (1984) 176.

[2] M. Langevin et al., Nucl. Phys. A366 (1981) 449.

[3] I. Mukha et al., Phys. Lett. B367 (1996) 65.

[4] M.J.G. Borge et al., Nucl. Phys. A613 (1997) 199.

[5] M. Madurga et al., in preparation

Primary authors: Dr FYNBO, Hans (Physics and Astronomy (Univ. of Aarhus)); Dr RIISAGER, Karsten (ISOLDE); Prof. GARCIA BORGE, Maria Jose (Consejo Superior de Investigaciones Cientificas (CSIC)); Mr MADURGA FLORES, Miguel (Consejo Superior de Investigaciones Cientificas (CSIC)); Dr TENGBLAD, Olof (Consejo Superior de Investigaciones Cientificas (CSIC))

Co-authors: Prof. JONSON, Bjorn (Fundamental Physics (Chalmers Univ.)); Prof. NYMAN, Goran (Fundamental Physics (Chalmers Univ.))

Presenter: Mr MADURGA FLORES, Miguel (Consejo Superior de Investigaciones Cientificas (CSIC))

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