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Observation of a Near-Threshold Proton Resonance in ^{11}B

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Experiments looking for near-threshold resonances in weakly bound nuclei provide a direct link between nuclear reactions and nuclear structure, via the interaction of discrete states with the continuum.

These states, located near the particle-decay threshold, accumulate most of the continuum strength in a single state and couple strongly to the decay-channel, exhausting most of the decay-width and carrying many of its characteristics. In particular, a near-threshold proton resonance in ^{11}B has long been sought since it would be the intermediate state that may help explain the controversially large β -p+ branching ratio from the ^{11}Be nucleus that has been observed in experimental measurements but is not in full agreement with theoretical calculations.

In this work I will discuss a recent experiment carried out at the John D. Fox Superconducting Linear Accelerator Laboratory at Florida State University where the near threshold proton resonance at 11.4 MeV in ^{11}B was observed for the first time, via the $^{10}\text{Be}(\text{d},\text{n})^{11}\text{B}$ reaction. The results and implications of our measurement will also be presented.

Topic

Experiment

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