



Contribution ID: 226

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## Positive-Parity Linear-Chain Molecular Band in $^{16}\text{C}$

An inelastic excitation and cluster-decay experiment  $^2\text{H}+^{16}\text{C}$  was carried out to investigate the linear-chain clustering structure in neutron-rich  $^{16}\text{C}$ . For the first time, decay paths from the  $^{16}\text{C}$  resonances to various states of the final nuclei were determined, thanks to the well-resolved  $Q$ -value spectra obtained from the threefold coincident measurement. The close-threshold resonance at 16.5 MeV is assigned as the  $J\pi = 0+$  band head of the predicted positive-parity linear-chain molecular band of  $\pi$ - $\sigma$  configuration, according to the associated angular correlation and decay analysis. Other members of this band were found at 17.3, 19.4, and 21.6 MeV based on their selective decay properties, being consistent with the theoretical predictions. Another intriguing high-lying state was observed at 27.2 MeV which decays almost exclusively to  $^6\text{He} + ^{10}\text{Be}(\sim 6 \text{ MeV})$  final channel, corresponding well to another predicted linear-chain structure with the pure  $\sigma$ -bond configuration.

### Topic

Experiment

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