



Contribution ID: 442

Type: **Contributed Oral Presentation**

Investigation of the σ -bond linear-chain molecular structure in ^{14}C

Monday, 26 May 2025 14:55 (15 minutes)

A recent inelastic-excitation and cluster-decay experiment, $^2\text{H}(^{14}\text{C}, ^{14}\text{C}^* \rightarrow ^{10}\text{Be} + ^4\text{He})^2\text{H}$, was conducted at an incident beam energy of 27.5 MeV/A. Neutron-rich ^{14}C projectile were inelastically excited to high-lying states beyond 20 MeV, which cover the theoretically predicted linear chain molecular rotational band with the σ -bond configuration. All three final particles in this reaction were detected, allowing the selection of the decay paths from the ^{14}C -resonances to various states of ^{10}Be fragment, based on the Q value spectrum. And the detection in most forward angle raises the chance for observing the near-threshold states with small relative energies. The 22.2 MeV state of ^{14}C primarily decays to a state near 6 MeV in its daughter nucleus ^{10}Be , consistent with previous experimental observations and theoretical predictions. This state is very likely the predicted band head of the σ -bond linear-chain molecular states of ^{14}C . Further spin-parity analysis is still on the way which may provide stronger evidence.

Primary authors: PU, Weiliang (Peking University); YE, Yanlin (Peking University)

Presenter: PU, Weiliang (Peking University)

Session Classification: Parallel Session

Track Classification: Nuclear Structure