



Contribution ID: 194

Type: **Contributed Oral Presentation**

Experimental Study on Negative-parity Linear-chain Rotational Bands in ^{16}C

Monday, 26 May 2025 15:25 (15 minutes)

There are indications of the existence of negative-parity linear-chain configurations in neutron-rich ^{16}C nuclei, which is worthy of further study [1,2]. Theoretical studies propose the existence of a Π - σ -bond negative-parity linear-chain rotational band in ^{16}C , which is more isolated from other non-clustering states. Further experiments are needed for its identification.

Based on these predictions, we have conducted an experiment in 2022 at the Radioactive Ion Beam Line at the Heavy Ion Research Facility in Lanzhou (HIRFL-RIBLL1) using secondary beams of ^{16}C impinging on a $(\text{CD}_2)_n$ target. Inelastic excitation induced by the deuterium target and the following up cluster-decay were measured.

In this presentation, we will present the current progress of the data analysis and the preliminary results so far obtained, in order to have discussions and anticipation about these particular chain structure in neutron-rich carbon isotopes.

[1] T. Baba et al. PHYSICAL REVIEW C 94 (2016) 044303.

[2] T. Baba et al. PHYSICAL REVIEW C 97 (2018) 054315.

Consent

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Session Classification: Parallel Session

Track Classification: Nuclear Structure