

Cluster Structures in ^{16}C

Monday, 26 August 2019 16:10 (15 minutes)

Theoretical calculation indicates the existence of molecule configuration in ^{16}C . Linear-chain configuration is a current research hotspot of various molecule configurations. The excited states of ^{16}C with $\pi 2\sigma 2$ configuration for the four valence neutrons is one of the most promising candidates for the linear-chain structure. The linear-chain configuration generates a rotational band built on the 05^+ state at 15.5MeV that is close to the $4\text{He}+^{12}\text{Be}$ and $6\text{He}+^{10}\text{Be}$ threshold energies and stable against the bending motion.

In experiments, there are several observables for cluster formation in a resonant state:

- 1.Excitation energy vs spin systematics: Requires good energy resolution, large statistics and good peak separation.
- 2.Large cluster decay width: Requires coincident measurement of both the fragments and the very low energy recoiled target particles.
- 3.Characteristic transition strength: Requires measurement of the angular distribution with very small cross sections.

Our group have completed relevant experiments on HIRFL(Lanzhou, China), and the main goal is to investigate the 3 alpha linear-chain structure in the high-lying excited state of ^{16}C ($E_x=14 \sim 25\text{MeV}$) via $1\text{H}(^{16}\text{C},4\text{He} + ^{12}\text{Be})1\text{H}$ and $1\text{H}(^{16}\text{C},6\text{He} + ^{10}\text{Be})1\text{H}$ inelastically break up reaction at 30MeV/A with both the invariant mass and missing mass methods in inverse kinematics.

Primary author: Mr MA, Kai (Peking University)

Presenter: Mr MA, Kai (Peking University)

Session Classification: Young Scientist Session 3