

# MEGHÍVÓ

Az MTA Atommagkutató Intézet előadótermében  
(Debrecen, Poroszlay út 6., XII. ép. III. em.)

2017. június 22-én, 11:00-kor

## Hoyle resonance and triple-alpha reactions in adiabatic hyperspherical method

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Hoyle state is the narrow near-threshold  $0^+$  state in  $^{12}\text{C}$ . It is well-known that the state plays an important role in stellar nucleosynthesis. Its width is extremely small and its precise calculation is challenging. We show an adiabatic hyperspherical coordinate method for calculating the bound and continuum energy spectrum of three particles interacting through both short-range and Coulomb potentials. A complex absorbing potential is employed to describe accurately the continuum wave functions.

This method is further applied to study the triple- $\alpha$  reaction process at low temperatures. We compute the triple- $\alpha$  reaction rate at temperatures from  $T = 0.01$  to  $10$  GK and compare with those available in the literature. Our reaction rate is found to be up to three orders of magnitude larger than the NACRE rate at low temperatures  $T \approx 0.01$  GK, while we find a reasonable agreement between them at higher temperatures  $T \gtrsim 0.1$  GK.



A szeminárium előtt 10:30-tól tea.

Gácsi Zoltán