



Contribution ID: 86

Type: Oral

Unravelling ^{12}C , the ISGMR and the Hoyle's ghost.

The $^{14}\text{C}(\text{p,t})^{12}\text{C}$ reaction was employed to investigate the much-discussed excitation energy region above the Hoyle state: there is evidence that suggests that in addition to the broad 0^+ state at 10.3 MeV, an additional 0^+ resonance is required at ~ 8.7 MeV. AMD calculations suggest that the Isoscalar Giant Monopole Resonance (ISGMR) may contribute to this region and suggest two distinct oscillation modes may play a role. The development of a new multi-channel R-matrix fitting programme aims to provide new insight by simultaneously analysing low-energy resonance data from multiple experiments (with different reaction channels). Moreover, a multi-channel two-level approximation is implemented which may help determine the contribution to this region from the ghost of the Hoyle state and any associated coherent interferences with other 0^+ states.

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Track Classification: Track A