



Contribution ID: 46

Type: Oral presentation

Observation of a near-threshold isoscalar dipole resonance in ^{10}Be using the AT-TPC coupled with SOLARIS

Thursday, 27 June 2024 11:00 (20 minutes)

The deuteron elastic and inelastic scattering reactions of ^{10}Be have been measured with the AT-TPC coupling with SOLARIS in inverse kinematics. The deformation length of the excited states in ^{10}Be below 9 MeV has been inferred from the differential cross sections with the CCBA calculation. A new 1^- state at 7.27(10) MeV, located just near the α -emission threshold, has been observed for the first time. It exhausts a large fraction of the isoscalar dipole energy-weighted sum rule, and has isoscalar characteristics, suggesting a strong α cluster structure in ^{10}Be . The Gamow Coupled Channel approach supports this interpretation and suggests the near-threshold effect might be playing a role in this excitation energy domain. The $2\alpha + 2n$ four-body calculation also support this picture and could reasonably reproduce the large E1 strength observed.

This material is based upon work supported by NSF's National Superconducting Cyclotron Laboratory which is a major facility fully funded by the National Science Foundation under award PHY-1565546; the U.S. Department of Energy, Office of Science, Office of Nuclear Physics, under Contract Number DE-AC02-06CH11357 (Argonne). SOLARIS is funded by the DOE Office of Science under the FRIB Cooperative Agreement DE-SC0000661.

Collaboration

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Session Classification: Thursday morning 2