CNRS - IN2P3 - UNIVERSITÉ PARIS - SUD
Institut de Physique Nucléaire - Orsay

SEMINAIRE DE LA DIVISION DE RECHERCHE

Pairing correlations in nuclei at neutron drip line

Pairing correlations in weakly bound nuclei at the edge of neutron drip line, ^{6}He and ^{11}Li (so called Borromean nuclei) are studied by using a three-body model in which two valence neutrons interact with each other by a density-dependent contact force. We point out that the di-neutron type correlations play a dominant role in these nuclei ^{6}He and ^{11}Li since the two neutrons have their spins coupled to S=0. The behavior of the neutron pair at different densities is analyzed by calculating the two-neutron wave function at various distances between the core nucleus and the center-of-mass of the two neutrons. With this representation, a strong concentration of the neutron pair on the nuclear surface is quantitatively established for neutron-rich nuclei. Namely, the neutron pair wave function in ^{11}Li has an oscillatory behavior at normal density, while it becomes a well localized single peak in the dilute density region around the nuclear surface. These features are in close analogy to the Bardeen-Cooper-Schrieffer (BCS) and to the Bose-Einstein condensate (BEC) phases of the Cooper pair wave function found in the infinite nuclear matter. The Coulomb break-up cross sections will be also discussed to probe the theoretical conjectures of the Borromean nuclei.

Hiroyuki Sagawa

Université d'Aizu, Japon
IPN Orsay, Université Paris-Sud

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16H - IPN, Salle des Conseils (Bât. 100)
Café / Thé à partir de 15h45

IPN - 91406 ORSAY Cedex - tél. +33 1 69 15 67 50 - fax +33 1 69 15 64 70
e-mail.....@ipno.in2p3.fr - web http:// ipnweb.in2p3.fr