東工大　理学院物理学系「物理学リーダーシップ」
FGIP : Foreign Graduate Student Invitation Program
外国人博士課程大学院生の短期招待・共同研究
FGIP - Student Forum セミナー

Aldric Revel (LPC Caen, France)

日時：2017年10月11日(水) 16:00-16:45, 場所： 本館156

Strong Neutron pairing in core+4n nuclei

Abstract:

Nuclear correlations involved in neutron-rich nuclei, up to the drip line, play essential roles in the understanding and modeling of neutron captures in the r-process nucleosynthesis as well as in the understanding of phenomena linked to the neutron star superfluidity. They are also interesting in view of generalizing the Ikeda conjecture, commonly applied to alpha clusters, to dineutron clusters above the corresponding emission threshold. We have discovered a novel method that allows to reveal neutron correlations in the nucleus and to search for dineutron contribution. This was achieved by studying the decay of high energy states above S 2n populated after the sudden knockout of a deeply bound nucleon. This sudden approximation, together with a quasi-free knockout process can reliably be assumed, owing to the high energy of the projectile used (440MeV/u) during the experiment. This experiment, performed at GSI, required the complex and innovative R3B-LAND setup to determine the full kinematics of the reaction. My presentation will be focused on the n-n correlations observed in the decay of unbound states in the 18 C and 20 O (viewed as 14 C+4n and 16 O+4n, respectively) populated via the sudden knockout of a proton in 19 N and a neutron in 21 O, respectively. We have studied the evolution of the n-n correlations as a function of the increasing energy Ed of the neutrons and compared the decay patterns of the two systems; i.e. the former, in which neutron pairs are in principle kept intact, and the second in which the 16 O core is broken, leaving two unpaired neutrons. We used a simulation that takes into account the different decay mechanisms
(direct and sequential decay) and the final state interactions to interpret the experimental data. Using information on n-n and core-n momenta, we show that we can clearly distinguish direct from sequential decays. Remarkably, direct decays are strongly dominant in 18 C up to Ed=8MeV, beyond which sequential decay amounts to only 20%. This is in contrast to the case of 20 O, in which sequential decays dominate already at low Ed, and in which much weaker n-n correlations are observed. Due to the success of this method, we are planning in a near future to extend such a study to other systems closer to the drip line and to generalize the study of neutron correlations to the 4n decay channel.

問い合わせ：中村研究室・斗米（内線2729）

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名前	大学・研究機関	滞在期間	受入担当
Aldric Revel	LPC Caen, France	10/1 - 10/16	斗米 貴人

http://info.phys.sci.titech.ac.jp/leadership/fgip/index.html
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