Service de Physique Nucléaire

Séminaire

le mardi 20 mai 2008 à 11h

CEA-Saclay SPhN, Orme des Merisiers Bât. 703 Salle 135

Pairing in nuclei at finite temperature and angular momentum

Nguyen DING DANG

Heavy-Ion Nuclear Physics Laboratory,
Nishina Center for Accelerator-Based Science, RIKEN
Institute for Nuclear Science and Technique, Hanoi

In small systems such as nuclei, large thermal fluctuations smooth out the sharp transition from the superfluid phase to the normal one. I will present two microscopic approaches to thermal pairing in finite nuclei, which we recently proposed, namely the modified BCS (MBCS) and the BCS + self-consistent quasiparticle RPA (BCS+SCQRPA). Both of them show that the fluctuation of quasiparticle number is responsible for smoothing out the sharp superfluid-normal phase transition. This leads to a pairing gap, which does not collapse at a critical temperature predicted by the conventional BCS theory, but has a tail extended to high temperatures. By extending the BCS+SCQRPA to finite angular momentum, the appearance of a thermally assisted pairing in hot and rotating nuclei is also predicted.

As an application of the theory, I will show the role of thermal pairing on the damping of giant dipole resonances (GDR) in highly-excited nuclei, namely the pairing effect in lowering the width of GDR at temperatures below 1.5 MeV. The theoretical prediction is compared with the experimental data for the GDR widths in tin isotopes.

Le café sera servi 10 minutes avant, en salle 125
Contact : vlapoux@cea.fr tél : 01 69 08 40 83
http://www-dapnia.cea.fr/Sphn/index.php