



国立研究開発法人理化学研究所 仁科加速器研究センター  
第237回 RIBF核物理セミナー  
RIKEN Nishina Center for Accelerator Based Science  
The 237th RIBF Nuclear Physics Seminar

Simultaneous Microscopic Description of Nuclear Level Density and Radiative Strength Function

Dr. Nguyen Dinh Dang  
(RIKEN)

The nuclear level density (NLD) and radiative strength function (RSF) are simultaneously described within a microscopic approach, which takes into account the thermal effects of the exact pairing as well as temperature-dependent widths of the giant resonances[1]. This approach uses the exact solutions of the pairing problem to construct the partition function to calculate the NLD and thermal pairing gap at finite temperature. The latter is included in the Phonon-Damping Model (PDM)[2] to calculate the RSF. The good agreement between the results obtained within this approach and the experimental data for NLD and RSF in  $170\text{--}172\text{Yb}$  shows that exact thermal pairing is indeed very important for the description of both NLD and RSF in the low and intermediate region of excitation and  $\gamma$ -ray energies. Moreover, to have a good description of the RSF the microscopic strength function with the temperature-dependent width for the giant resonances should be used instead of the Brink-Axel hypothesis. The merits of this approach are its microscopic nature and the absence of parameter fitting at different excitation and  $\gamma$ -ray energies. It does not consume much computing time either.

[1] N. Quang Hung, N. Dinh Dang, L.T. Quynh Huong, Phys. Rev. Lett. 118 (2017) 022502.

[2] N.Dinh Dang and A. Arima. Phys. Rev. Lett. 80 (1998) 4145.

\* The talk will be given in English language..

Contact: Nuclear Physics Seminar Organizing Committee  
[npsoc@ribf.riken.jp](mailto:npsoc@ribf.riken.jp)  
<http://ribf.riken.jp/~seminar/>

Apr.11th(Tues.)2017 13:30~  
RIBF Hall (rm.201), RIBF bldg., RIKEN