

PREFACE • **OPEN ACCESS**

## International Symposium on Exotic Nuclear Structure From Nucleons (ENSFN 2012)

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## Preface

The International Symposium on “Exotic Nuclear Structure From Nucleons (ENSNF2012)” was held at the Koshiba Hall, the University of Tokyo, Japan, from October 10th to 12th, 2012. This symposium was supported by RIKEN Nishina Center (RNC) and the Center for Nuclear Study (CNS), University of Tokyo.

This symposium was devoted to discussing recent achievement and perspectives in the structure of exotic nuclei from the viewpoint of the nuclear force.

The following subjects were covered in this symposium from both theoretical and experimental sides:

- Evolution of shell structure and collectivity in exotic nuclei
- Ab-initio theory and its application to exotic nuclei
- Advancement in large-scale nuclear-structure calculations
- Effective Hamiltonian and energy density functional
- Spin-isospin responses
- New aspects of two- and three-body forces
- Impact on nuclear astrophysics

Emphasis was placed on the development of large-scale nuclear-structure calculations and the new experimental information on exotic nuclei.

Around 80 participants attended this symposium and we enjoyed 37 excellent invited talks and 9 selected oral presentations. A special talk was presented to celebrate the 60th birthday of professor Takaharu Otsuka, who has made invaluable contribution to the progress in the fields covered in this symposium.

The organizing committee consisted of T. Abe (Tokyo), M. Honma (Aizu; chair), N. Itagaki (YITP, Kyoto), T. Mizusaki (Senshu), T. Nakatsukasa (RIKEN), H. Sakurai (Tokyo/RIKEN), N. Shimizu (CNS, Tokyo; scientific secretary), S. Shimoura (CNS, Tokyo), Y. Utsuno (JAEA/CNS, Tokyo; scientific secretary).

Finally, we would like to thank all the speakers and the participants as well as the other organizers for their contributions which made the symposium very successful.

Michio Honma, Yutaka Utsuno and Noritaka Shimizu  
Editors, Tokyo, April 2012





International Symposium on  
Exotic Nuclear Structure From Nucleons

# ENSFN 2012

October 10-12, 2012  
Koshiba Hall, University of Tokyo

## Topics

Evolution of shell structure and collectivity in exotic nuclei  
Ab-initio theory and its application to exotic nuclei  
Advancement in large-scale nuclear-structure calculations  
Effective Hamiltonian and energy density functional  
Spin-isospin responses  
New aspects of two- and three-body forces  
Impact on nuclear astrophysics

## Organizing Committee

Takashi Abe (Tokyo)  
Michio Honma (Aizu; chair)  
Naoyuki Itagaki (YITP, Kyoto)  
Takahiro Mizusaki (Senshu)  
Takashi Nakatsukasa (RIKEN)  
Hiroyoshi Sakurai (Tokyo/RIKEN)  
Noritaka Shimizu (CNS, Tokyo; scientific secretary)  
Susumu Shimoura (CNS, Tokyo)  
Yutaka Utsuno (JAEA; scientific secretary)

## Website

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Sponsored by  
RIKEN Nishina Center,  
Center for Nuclear Study, University of Tokyo





**ENSFN2012 Scientific Program****October 10**

9:00-9:30 Registration

Chairperson: W. Nazarewicz (Univ. Tennessee/ORNL)

9:30-9:40 M. Honma (Univ. Aizu)

*Opening address*

9:40-10:05 M. Hjorth-Jensen (Univ. Oslo)

*Evolution of shell structure in neutron-rich isotopes and the stability of nuclear matter*

10:05-10:30 I. Tanihata (RCNP, Osaka. Univ.)

*An evidence of the tensor force in nuclear configuration*

10:30-10:55 K. Sekiguchi (Tohoku Univ.)

*Experimental approach to three nucleon forces via few nucleon systems*

Break (10:55-11:25)

Chairperson: N. Itagaki (YITP, Kyoto Univ.)

11:25-11:50 B. R. Barrett (Univ. Arizona)

*Microscopic calculations of nuclear structure beyond the 0p-shell*

11:50-12:15 K. Takayanagi (Sophia Univ.)

*Effective Hamiltonian in non-degenerate model space*

12:15-12:40 N. Shimizu (CNS, Univ. Tokyo)

*History and future perspectives of the Monte Carlo shell model method*

12:40-12:55 L. Liu (Peking Univ.)

*No-core Monte Carlo shell-model calculation for  $^{10}\text{Be}$  and  $^{12}\text{Be}$  low-lying spectra*

Lunch (12:55-14:10)

Chairperson: H. Sakurai (Univ. Tokyo/RNC, RIKEN)

14:10-14:35 A. Gade (MSU)

*Nuclear spectroscopy with fast exotic beams*

14:35-15:00 G. Neyens (KU Leuven)

*Ground state moments of neutron-rich K and Al isotope as probes for changes in shell structure*

15:00-15:25 Y. Utsuno (JAEA)

*Towards unified description of the shell evolution*

Break (15:25-15:55)

Chairperson: P. Van Isacker (GANIL)

15:55-16:20 N. Aoi (RCNP, Osaka Univ.)

*Study of shell evolution with in-beam gamma-ray spectroscopy*

16:20-16:45 T. Duguet (CEA Saclay)

*How shall we talk about the shell structure?*

Reception (17:30-19:30) at "GOTEN", Sanjo Conference Hall B1

**October 11**

Chairperson: R. V. F. Janssens (ANL)

9:00-9:25 A. Schwenk (TU Darmstadt)

*Three-nucleon forces and nuclei at the extremes*

9:25-9:50 B. A. Brown (MSU)

*Pairing and shell gaps*

9:50-10:15 H. Nakada (Chiba Univ.)

*Mean-field and RPA approaches to stable and unstable nuclei with semi-realistic NN interactions*

10:15-10:30 D. Steppenbeck (CNS, U. Tokyo)

*Investigating the strength of the  $N=34$  subshell closure in  $^{54}\text{Ca}$* 

Break (10:30-11:00)

Chairperson: B. A. Brown (MSU)

11:00-11:25 P. Van Isacker (GANIL)

*Shell-model derivation of the shears mechanism*

11:25-11:50 N. Tajima (Fukui Univ.)

*Angular correlation between proton and neutron rotors*

11:50-12:15 K. Nomura (Univ. Koeln)

*Interacting boson model with energy density functionals*

12:15-12:30 S. Zhu (ANL)

*First  $\beta$ -decay study with CARIBU and Gammasphere:  $^{142,144}\text{Cs} \rightarrow ^{142,144}\text{Ba}$* 

Lunch (12:30-13:30)

Chairperson: T. Nakatsukasa (RNC, RIKEN)

13:30-13:55 W. Nazarewicz (Univ. Tennessee/ORNL)

*Microscopic description of the fission process*

13:55-14:20 J. Meng (Peking Univ.)

*Exotic nuclear structure and origin of the heavy nuclei with covariant density functional theory*

14:20-14:45 Y. Iwata (GSI)

*Time-dependent density functional calculations for fusion and fission*

14:45-15:10 T. Uesaka (RNC, RIKEN)

*Spin-isospin responses studies with RI-beams*

Break (15:10-15:30)

Chairperson: J. Meng (Peking Univ.)

15:30-15:55 S. Shimoura (CNS, Univ. Tokyo)

*Physics opportunities using double-charge exchange reactions*

15:55-16:20 M. Matsuo (Niigata Univ.)

*Continuum dipole response near the threshold and the direct neutron capture cross section at astrophysical energies*

16:20-16:35 M.-K. Cheoun (Soongsil Univ.)

*High-lying Gamow-Teller excited states in the deformed nuclei,  $^{76}\text{Ge}$ ,  $^{82}\text{Se}$  and  $N = 20$  nuclei in the island of inversion by the deformed quasi-particle RPA*

16:35-16:50 S. Ebata (CNS, Univ. Tokyo)

*Systematic investigation of  $E1$  strength for the isotopes from  $Z = 28$  to  $50$*

Break (16:50-17:10)

Chairperson: T. Motobayashi (RNC, RIKEN)

17:10-17:35 A. B. Balantekin (Univ. Wisconsin-Madison)

*Neutrinos and rare isotopes*

17:35-18:00 G. J. Mathews (Univ. Notre Dame)

*Updated nuclear equation of state for core-collapse supernovae and neutron stars: Effects of 3-body forces, QCD, and magnetic fields*

18:00-18:25 T. Kajino (NAO)

*Nuclear weak interactions, supernova nucleosynthesis and neutrino oscillation*

18:25-18:40 M. Famiano (W Mich. Univ.)

*Nuclear structure inputs to the production of heavy nuclei in accretion-induced black hole formation*

**October 12**

Chairperson: A. Gade (MSU)

9:00-9:25 R. V. F. Janssens (ANL)

*Changes in shell structure in  $A \sim 60$  neutron-rich nuclei as a function of spin*

9:25-9:50 S. M. Lenzi (Univ. Padova)

*Deformation and shape coexistence in neutron-rich nuclei at  $N=40$* 

9:50-10:05 K. Yoshida (Niigata Univ.)

*Skyrme energy-density functional approach to collective modes of excitation in exotic nuclei*

10:05-10:20 Y. Tsunoda (Univ. Tokyo)

*Study of medium-mass nuclei by large-scale shell model calculations*

Break (10:20-10:50)

Chairperson: Y. Akaishi (KEK)

10:50-11:15 D. J. Dean (ORNL)

*Pairing reentrance phenomenon in heated rotating nuclei in the shell-model Monte Carlo approach*

11:15-11:40 N. Pietralla (TU Darmstadt)

*Exotic ideas on mixed proton-neutron symmetry and their manifestation in heavy nuclei*

11:40-12:05 S. Pittel (Univ. Delaware)

*Spherical to deformed shape transitions in the nucleon pair shell model*

12:05-12:30 N. Yoshinaga (Saitama Univ.)

*Band structure of neutron rich Se and Ge isotopes*

Conference Photo &amp; Lunch (12:30-13:40)

Chairperson: H. Horiuchi (RCNP, Osaka Univ.)

13:40-14:05 T. Nakamura (Tokyo Inst. Tech.)

*Deformed halo nuclei probed by breakup reactions*

14:05-14:30 R. Kanungo (St. Mary's Univ.)

*Soft dipole resonance and nucleon distribution in halo nuclei*

14:30-14:55 P. Maris (Iowa St. Univ.)

*Emergence of rotational bands in Be isotopes from ab initio calculations*

Break (14:55-15:25)

Chairperson: S. Shimoura (CNS, Univ. Tokyo)

15:25-15:50 J. Maruhn (Univ. Frankfurt)

*Exotic cluster structures in the mean-field theory*

15:50-16:15 Y. Kanada-En'yo (Kyoto Univ.)

*Structures of ground and excited states in C isotopes*

16:15-16:30 T. Yoshida (CNS, Univ. Tokyo)

*Density profiles in the intrinsic frame of light nuclei obtained from Monte Carlo shell model calculation*

16:30-16:40 T. Otsuka (Univ. Tokyo)

*Closing*