

## JUSTIPEN report of Alexander Lisetskiy, University of Arizona

My trip to JAPAN supported by the JUSTIPEN grant includes several scientific activities.

First, I have attended the International Nuclear Physics Conference in Tokyo (June 3–8) and presented poster "Towards Effective Interaction Renormalization for No-Core Shell Model".

Second, I have attended the International Workshop on Nuclear Structure "New Pictures in the Extended Isospin Space" held in Kyoto (June 11–14), where I had an oral presentation about "Effects of N=20 shell closure erosion on M1 and E2 properties". I had a chance to exchange ideas and results with many Japanese, American and European colleagues at both conferences.

Third, I have spent the rest of the time (June 9–10 and 15–28) supported by the JUSTIPEN grant at the RIKEN. During this period I have presented the results of my recent work "Embedding many-body correlations into two-body effective interactions for small shell model spaces" and wrote the draft version of the corresponding paper. This research direction deals with a new technique to derive standard shell model effective interaction using results of No Core Shell Model (NCSM). Our NCSM results for A=18 nuclei and derived interaction for the sd-shell has ignited interesting discussion and exchange of ideas with Prof. T. Otsuka and Dr. S. Fujii working on related problem of double unitary transformation technique for effective interactions in A~12 mass region. There is a overlap with our Japanese colleagues and we agreed to start a common project. Our idea is to trace the tensor part of the bare NN interaction when performing Lee-Suzuki unitary transformation for NCSM and secondary unitary transformation for shell model with inert core.

I have also presented the results of the work on "Exotic Nuclear Landscape in a vicinity of  $^{78}\text{Ni}$ " focused on the construction of the semi-empirical effective interaction for the exotic region. This project stimulated productive discussions with experimentalists (Dr. K. Yoneda) planning an experiment for  $^{78}\text{Ni}$  as well as theoreticians (M. Honma and T. Otsuka) working on related problem. Both, our and Japanese group results, indicate considerable softness of expected doubly-magic  $^{78}\text{Ni}$  core that will be checked directly at RIKEN experiment on  $^{78}\text{Ni}$ . We found that there is a great potential for the collaboration towards improvement of the effective interactions produced independently by two groups.