

REPORT ON A VISIT TO RIKEN AND OMEG07 CONFERENCE DEC 2007

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I attended the Omeg07 (Origin of Matter and Evolution of Galaxies) conference in Sapporo Dec 4–6. Here I found it particularly interesting to hear the up-to-date status of observations of abundances in extremely metal-poor stars and about different efforts to model the observed abundances. It was also interesting to hear about the extremely powerful facilities coming on line in the near future, in particular the facility at Tokai, and about first results from the RIA facility at RIKEN (obviously I got more details later during my visit). I also had numerous discussions with different conference participants about nuclear mass models, the cons and pros of various efforts. Myself I presented our latest results in the area of nuclear mass and fission modeling. My contribution will shortly be available at <http://t16web.lanl.gov/Moller/abstracts.html>

After the conference I visited RIKEN Dec 7 -18. Here I worked with Takatoshi Ichikawa on three different issues.

1. Ichikawa has written, completely independently, a macroscopic-microscopic code for the folded-Yukawa single-particle potential coupled with the FRLDM macroscopic model for several shape parameterizations, including the β parameterization and the three-quadratic-surface parameterization, which I also use. We compared our completely independent results in minute detail. We compared energy levels, wave-function components, pairing energies, macroscopic energies in both parameterizations. We found excellent agreement for everything we compared. Furthermore we discussed selection of basis functions for large distortions, selection of deformation grid points for fission potential-energy surface calculations and other issues:
2. We independently set up our respective codes to calculate matrix elements of operators. As a first project we calculated elements of Q_{20} . We are collaborating with Henrik Uhrenholt in Lund in studies of level densities and the matrix elements are now being used by him in calculations of the vibrational enhancements to level densities.
3. We continued work on our large-scale study of fission potential-energy surfaces in the actinide region. We anticipate to submit a paper to PRC in April 2008. We have completed the calculation and tabulation of 1585 barrier heights from $Z = 78$ to $Z = 126$ and are just putting finishing touches on the paper

Apart from working on these specific projects we tried to define next steps in another area of long-term interest to us namely various aspects of low-energy fusion reactions and how to better understand the fusion reactions leading to heavy-element formation and sub-barrier fusion (we have several papers in this area).

During my stay I met several visitors to RIKEN, including my collaborators H. Sagawa and A. Iwamoto. I was delighted to learn that RIKEN has now formed a theory group.

The travel funds associated with this visit were provided through JUSTIPEN. I appreciate very much the opportunity this grant gave me to continue my longstanding collaborations with several Japanese groups.