Exit report of Sakir Ayik

Sakir Ayik in collaboration with Denis Lacroix and Marek Ploszajczak organized a two days topical meeting on “Challenges in the microscopic description of nuclear large amplitude collective dynamics” during October 13-14, 2014 at GANIL. A number of experimental and theoretical nuclear physicists mostly from Europe participated at the workshop. Lively discussions took place after each 30 minutes presentations. S. Ayik presented a talk on “Quantal Corrections to Mean-Field Dynamics”, and acted as a chairman for Tuesday afternoon session. On Wednesday, S. Ayik and M. Ploszajczak carried out very useful discussion on the application of Stochastic Mean-Field (SMF) approach on spinodal dynamics and description of nuclear multi-fragmentations. Suggestions made by M. Ploszajczak on this topic will hopefully lead to fruitful collaborations between two groups.

On Wednesday evening, S. Ayik travel to IPN-ORSAY. D. Lacroix, who has recently moved from GANIL to IPN, is a long term collaborator of mine. Recently, we carried out various applications of the SMF to nuclear dynamics including dissipation and fluctuation mechanisms and nucleon exchange in deep inelastic collisions. Most recently, we are interested in microscopic description of the induced fission mechanism of hot compound nuclei. Ordinary mean-field approximation, since initial symmetries are preserved, cannot describe induced fission process. In the SMF approach, quantal zero point and thermal fluctuations in the initial state are incorporated into the description. The approach requires generating an ensemble of mean-field events specified by the initial state fluctuations. In the case induced fission of a hot nucleus, a practical simulation method can be developed by realizing that density fluctuations of the initial state are dominated by a few low frequency collective modes such as quadrupole and octopole modes. Since these modes are initially harmonic, their zero point and thermal fluctuations have Gaussian distributions in the phase-space. This project involves different aspects including construction of the potential energy landscape in quadrupole-octupole plane, constructing of the initial phase space distributions in those collective mode and simulations of ensemble of events. We carried out extensive discussions with D. Lacroix and his recent post doc. Y. Tanimura on various aspect of this project. Also, S. Ayik presented a seminar on “Quantal Corrections to Mean-Field Dynamics”, which was an extended version of the talked presented in the GANIL workshop.