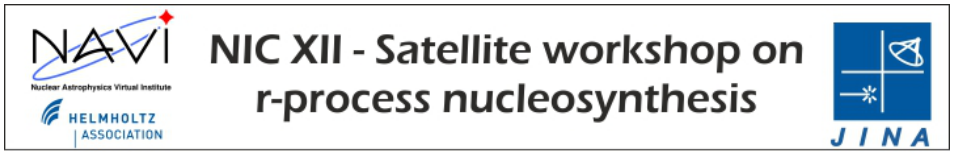

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Are Core-Collapse Supernovae still possible sites for the r-process?

Saturday, 4 August 2012 14:00 (30 minutes)

The problem of astrophysical site(s) for the r-process is still shrouded in mystery despite more than a half century of studies. Although neutrino driven winds have been considered to be the most likely success, recent state of the art hydrodynamic simulations show that it is seriously difficult to achieve suitable conditions for r-process by that scenario. We are reinvestigating the other astrophysical sites for the r-process, therefore, which are special types of core-collapse supernova including magnetically driven jets, compact star mergers, and so on.

In this presentation I will talk about a new idea for the r-process after I briefly reviewed recent progress of the studies. I will show the results of r-process nucleosynthesis based on special types of supernova via the Quark-hadron phase transition during the early post-bounce phase of core-collapse. We have investigated detailed properties of heavy element nucleosynthesis on the bases of one-dimensional general relativistic hydrodynamic simulations with neutrino transport and the nuclear and quark equation of states. In addition, I also want to briefly remark the progress and preliminary results
of r-process studies for magnetically driven core-collapse supernovae.

Primary author: Dr NISHIMURA, Nobuya (University of Basel)

Presenter: Dr NISHIMURA, Nobuya (University of Basel)

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