

## Experimental and Astronomical Challenge to Neutron Star Matter



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Thursday, 30th June, 17:00-  
KMI Science Symposia (ES635)

I will report on our research activities by the Grant-in-Aid for Scientific Research on Innovative Areas, "Nuclear Matter in Neutron Stars Investigated by Experiments and Astronomical Observations".

We have been experimentally investigating various neutron-rich nuclei and hypernuclei at RIKEN RIBF and J-PARC. The obtained data are being used to improve the nuclear and hadronic equation of state (EOS) governing the nuclear/hadronic matter in neutron stars.

Experimental results for ultra-cold Fermionic atoms are also converted to the neutron matter EOS at low density regions. On the other hand, observations via X-ray satellites are expected to provide reliable information on the neutron star radius, which gives stringent constraints on the EOS.

I will also discuss our experimental strategy to solve "hyperon puzzle", a serious discrepancy between the recently-observed heavy neutron stars with 2 solar masses and the soft EOS's predicted by experimentally-established attractive hyperon-nucleon interactions.