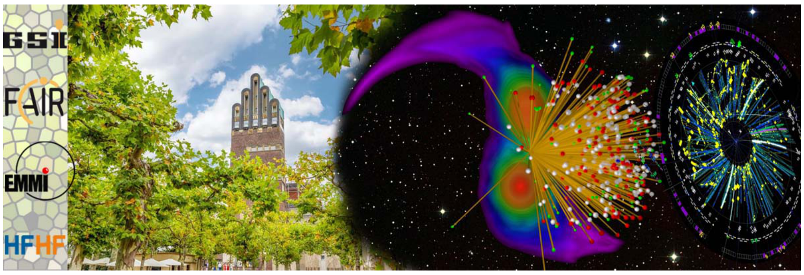
NuSym23, XIth International Symposium on Nuclear Symmetry Energy



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Constraining the Equation of State of Nuclear Matter (Overview)

Monday, 18 September 2023 09:30 (30 minutes)

Experimental measurements of nuclear systems with different neutron and proton numbers have enabled significant progress in constraining the EoS of nuclear matter. Careful experimental and theoretical analyses can now provide experimentally grounded constraints on the nuclear symmetry energy over a range of densities and isospin asymmetries. Over such densities, existing constraints on the symmetric matter exist. When these are combined with newer symmetry energy constraints, values for the nuclear matter Equation of State (EoS) can be obtained over a range of densities and asymmetries. One may expect that such experimentally based constraints on the symmetry energy become more stringent when more focused investigations of the nuclear symmetry energy are performed at advanced rare isotope facilities. At least three such measurements are currently being prepared and more can be expected. Nuclear constraints have been combined with Neutron Star (NS) radii deduced from NICER/XMM-Newton NS observations of PSRJ0030+0451 and PSRJ0740+6620 and with NS deformabilities obtained by the LIGO-VIRGO collaboration from the GW170817 NS merger event. Such combinations allow overall constraints on the total EoS of nuclear matter at densities of up to 3 times saturation density as well as predictions regarding the probability of Dirac Urca cooling processes in a massive NS.

Primary author: LYNCH, William (Michigan State University)

Presenter: LYNCH, William (Michigan State University)

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