Neutron rich nuclear matter Equation of State in nuclear physics

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Teaching staff

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Program of the course:

The equation of state (EOS) of nuclear matter will be investigated in different regions of nuclear densities, analyzing several aspects connected with heavy ion collisions from Fermi toward relativistic energies.
Some aspects of connection with novel multi-messenger astronomy of neutron-star physics will also be discussed.

Syllabus

- Equation of state of infinite nuclear matter
- Symmetry energy in finite system
- Eos of asymmetric nuclear matter
- Experimental investigation of the equation-of-state in isospin-asymmetric matter at low densities.
- Experimental investigation of the equation-of-state in isospin-asymmetric matter at high densities.
- Connection of EOS with multi-messenger astrophysics

Bibliography:

1. P. Russotto, M. D. Cozma, E. De Filippo et al.*" Studies of the equation-of-state of nuclear matter by heavy-ion collisions at intermediate energy in the multi-messenger era",* La Rivista del Nuovo Cimento (2023) 46:1–70
2. A. Sorensen et al., "Dense nuclear matter equation of state from heavy-ion collisions" Progress in Particle and Nuclear Physics, 134 (2024) 104080
3. B.A. Li, À. Ramos, G. Verde, I. Vidaña, *Topical issue on nuclear symmetry energy*. Eur. Phys. J. A 50(2), 9 (2014).
4. Scientific papers and slides provided by the teacher