

PHAROS Conference 2019: the multi-messenger physics and astrophysics of neutron stars



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r-modes in rapidly rotating neutron stars

In this talk I will discuss recent progress in r-mode physics. r-modes attract attention of neutron-star community since 1998 when it was realized that they should be unstable in rotating neutron stars due to radiation of gravitational waves. Various dissipative mechanisms stabilize r-modes in a wide range of parameters, so that r-mode instability can potentially take place only in sufficiently hot and rapidly rotating neutron stars, in the so-called “instability window”. Even being unstable r-mode may saturate at very low, negligible, amplitude, as some authors predict. I will review possible dissipative and saturation mechanisms, which could be relevant to r-modes. I will also discuss how the r-modes can show up in observations and what we can learn confronting observations of rapidly rotating neutron stars with the r-mode theory.

Primary author(s) : Dr KANTOR, Elena (Ioffe Institute)

Presenter(s) : Dr KANTOR, Elena (Ioffe Institute)