

Effects of phase transition induced density fluctuations on pulsar dynamics

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We show that density fluctuations during phase transitions in pulsar cores may have non-trivial effects on pulsar timings, and may also possibly account for glitches and anti-glitches. These density fluctuations invariably lead to non-zero off-diagonal components of the moment of inertia, leading to transient wobbling of star. Thus, accurate measurements of pulsar timing and intensity modulations (from wobbling) may be used to identify the specific pattern of density fluctuations, hence the particular phase transition, occurring inside the pulsar core. Changes in quadrupole moment from rapidly evolving density fluctuations during the transition, with very short time scales, may provide a new source for gravitational waves.

Primary author: Mr BAGCHI, Partha (Institute of Physics, Bhubaneswar, India)

Co-authors: DAS, ARPAN (Institute of Physics, Bhubaneswar); SRIVASTAVA, Ajit M. (Institute of Physics, Bhubaneswar, India); LAYEK, Biswanath (Institute of Physics, Bhubaneswar, India)

Presenter: Mr BAGCHI, Partha (Institute of Physics, Bhubaneswar, India)

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