APCTP SEMINAR
Fluid-dynamical analogue of nonlinear gravitational wave memory

Date/Time   14:00-15:00, June 11 (Fri.), 2021

Venue   APCTP Seminar room #512 & Online ZOOM

Speaker   **Satadal Datta** (SNU)

Abstract   We consider the propagation of nonlinear sound waves in a perfect fluid at rest. From the Riemann wave equation of nonlinear acoustics in one spatial dimension, we derive the wave equations for the metric perturbations in an effective 1+1D spacetime. It is shown that an analogue of gravitational wave memory is produced by waves carrying a constant density perturbation at their tails. As a corollary, we construct an analogue of the elusive nonlinear gravitational wave memory predicted by Christodoulou, for which the nonlinearity of spacetime dynamics is due to the nonlinearity of the perfect fluid equations. For concreteness, we employ a box-trapped Bose-Einstein condensate, and suggest an experimental protocol to observe the analogue of gravitational wave memory.

Webinar (ZOOM)
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