Canadian Association of Physicists
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Contribution ID: **4356** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Dynamics of freely expanding Bose-Einstein Condensates and formation of sonic black hole horizons

Tuesday 28 May 2024 11:30 (15 minutes)

We study the free evolution of dilute Bose-Einstein condensate (BEC) gases which have been initially trapped and released from various differently shaped confining potentials. By numerically solving the Gross-Pitaevskii equation and analytically solving the hydrodynamic Thomas-Fermi theory for each case, we find the presence of acoustic horizons within rarefaction waves which form in the outer edges of the BECs. We comment on the horizon dynamics, the formation of oscillations near the horizon, and connections to acoustic Hawking radiation.

Keyword-1

Bose-Einstein condensates

Keyword-2

Black holes

Keyword-3

Dynamics

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