

Correlation patterns in a BEC Black Hole Analog with Massive Phonons

I. ABSTRACT

Several features associated with the Hawking effect have been predicted to occur in Bose Einstein condensate(BEC) black hole analogs. We investigate an effective 1+1D BEC which has a constant flow velocity and a varying speed of sound in such a way as to create an acoustic black hole. The phonons in the BEC are allowed to be excited along the direction of flow as well as the transverse direction. This transverse excitation adds a mass-like term to the mode equation for the phonons. Using a simple approximation to the mode equation we compute the density-density correlation function for the phonons and compare to previous results. We investigate the correlation patterns which arise due to the mass-like term, which are significantly different from the massless case.