

# Hawking Radiation and Quantum Fluctuations in BEC

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We study the density-density correlation function  $g_2(x, x')$  near the acoustic horizon in a quasi uni-dimensional transonic flow realized in a Bose-Einstein condensate. The aim is to accurately describe for the first time the detailed structure of  $g_2$  near the horizon in a realistic configuration. For this purpose one needs to take the specifics of the flow into account and to include evanescent modes in the theoretical description of the elementary excitations. This should make it possible to perform a detailed comparison with the recent experimental findings of Steinhauer [1].

- [1] J. Steinhauer, Observation of quantum Hawking radiation and its entanglement in an analogue black hole, Nature Physics volume 12, pages 959–965 (2016)

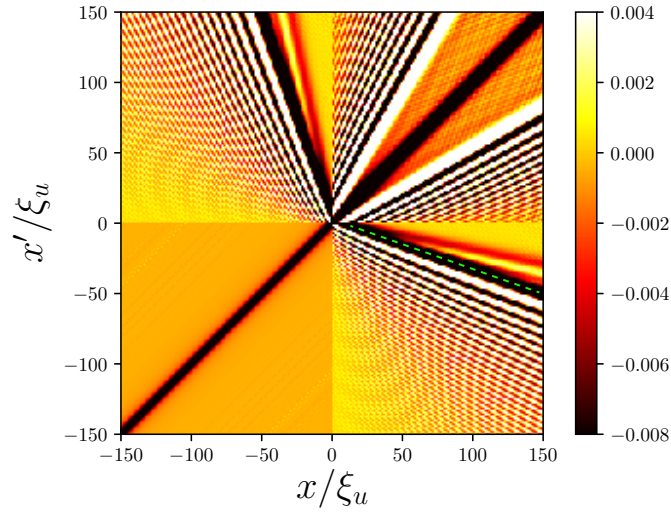


Figure 1: Density-density correlation function  $\xi_u n_u g_2(x/\xi_u, x'/\xi_u)$ . The variables  $\xi_u$  and  $n_u$  are the healing length and the asymptotic density in the subsonic region (outside the black hole). The green dashed line corresponds to a signature of the analogue of the Hawking signal.