

Analogue Hawking radiation in BECs: recent results regarding the black-hole laser effect

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In recent years physicist J. Steinhauer made important progresses in the field of sonic black holes created in Bose-Einstein condensates; in particular, in two different works published on Nature Physics, he claimed to have observed the analogue of the black-hole laser effect and of the Hawking radiation (the famous radiation predicted in 1974 by S.Hawking which causes black holes to “evaporate”). Starting from the first of these two works [1], we developed few numerical simulations in order to further test J. Steinhauer’s claims, reaching substantially different conclusions [2] which were later supported by independent studies by another team [3]. Furthermore, these results triggered a new work which has recently lead to the demonstration that the effects seen in the experiment are unrelated to hydrodynamical instabilities (and thus to the black-hole laser effect).

[1] J. Steinhauer, Nature Phys. **10**, 864 (2014)

[2] M. Tettamanti, S. L. Cacciatori, A. Parola, I. Carusotto, EPL **119** 50002 (2017)

[3] Y.-H. Wang, T. Jacobson, M. Edwards, C. W. Clark, Phys. Rev. A **96**, 023616 (2017)