

SOLVAY COLLOQUIUM



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Quantum superfluids as analog models of gravity: a fruitful synergy of gravity and quantum optics

In this talk, I will present the state of the art and the new perspectives in the theoretical and experimental work on the quantum simulation of gravitational problems using condensed matter and optical systems, the so-called analog models of gravity.

I will start with a general introduction to the general concept of analog model and a review of milestone theoretical and experimental works on Hawking emission of phonons from acoustic horizons in trans-sonic flows of ultracold atoms.

I will then present the on-going theoretical and experimental studies of false vacuum decay processes at the Pitaevskii BEC Center: I will present experimental evidence of the decay of an extended metastable state via the nucleation of spatially localized bubbles in a two-component atomic superfluid and I will highlight its connection to open questions in quantum field theory and cosmology.

Tuesday 15 April 2025 at 4:00 P.M.

COFFEE AND TEA WILL BE SERVED AT 3:45 P.M IN FRONT OF THE SOLVAY ROOM

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