UCLA

AMO Physics Seminar

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Physics & Astronomy Building (PAB) 4-330

Observation of stimulated Hawking radiation in an optical analogue

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Hawking radiation, the quantum emission of light from black holes, is too weak to be measured from known astrophysical sources. However, experimental observations can be made in laboratory settings using analogue systems. In such systems, the space-time geometry of the event horizon is mimicked by a moving medium.

In this talk, I will present recent experimental observations of a stimulated Hawking effect from a fiber optical analogue of the event horizon. In our experiment, a few-cycle laser pulse traveling in a highly nonlinear optical fiber creates an effective moving medium. As a result, probe light traveling with similar group velocity experiences an event horizon.

We observe the scattering of the probe by the pulse into positive and negative frequency modes. These frequencies are exactly the frequencies that will be spontaneously emitted when the probe is the quantum vacuum. This study paves the way for the observation of spontaneous Hawking radiation and related phenomena.