

Mimicking interacting relativistic theories with stationary pulses of light

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One of the most well known relativistic field theory models is the Thirring model (TM). We propose a quantum system as a simulator of the TM dynamics. Here the relativistic particles are mimicked by polarized photons in a quantum nonlinear medium. We show that the entire set of regimes of the Thirring model – bosonic or fermionic, and massless or massive – can be faithfully reproduced using coherent light trapping techniques. The sought after correlations' scalings can be extracted by simple probing of the coherence functions of the light using standard optical techniques.

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