Analog quantum simulation of superradiance and subradiance in trapped ions R. T. SUTHERLAND, Lawrence Livermore Natl Lab — We discuss a protocol for the analog quantum simulation of superradiance and subradiance using a linear chain of N trapped qubit ions with a single sympathetic cooling ion. We develop a simple analytic model that shows the dynamics of the qubit subspace converge to those of a cloud undergoing Dicke superradiance and subradiance. We provide numerical simulations of the full ion chain and show that they converge to the dynamics predicted by our analytic model with no fitting parameters. We also map out the parameter regime needed to reach this convergence.

Robert Sutherland
Lawrence Livermore Natl Lab

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