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Controlling collective rotational excitations of polar molecules in optical lattices FELIPE HERRERA, MARINA LITINSKAYA, ROMAN KREMS, Department of Chemistry, University of British Columbia, Vancouver BC, V6T1Z1, Canada — We consider a two-species mixture of ultracold LiCs and LiRb molecules in the ground rotational state trapped on an optical lattice with one molecule per site. Rotational excitation of LiCs molecules gives rise to rotational excitons that undergo multiple collisions with LiRb molecules. This leads to localization of excitons. We present the results of numerical simulations demonstrating that the localization of excitons as well as interference patterns due to multiple scattering events can be controlled by applying an external electric field or varying the concentration and distribution of the LiRb molecules. The two-species mixture of polar molecules trapped on an optical lattice can thus be used as a quantum simulator of localization phenomena in disordered media. Our results show that the localization of excitons in the proposed system can be studied in real time.

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