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Tunneling, Diffusion and Dissociation of Feshbach Molecules in Optical Lattices TAYLOR BAILEY, CARLOS BERTULANI, Texas A&M University-Commerce, EDDY TIMMERMANS, Los Alamos National Laboratory — We show that tunneling and diffusion of cold Rydberg molecules in optical lattices leads to somewhat unexpected effects. One of these effects is the resilience of the molecules to dissociation as their binding energy decreases. We also quantify the dynamics of molecular diffusion and dissociation of molecules in 1D harmonic optical lattice potential by comparing to analytical models. It is found that after an initial transient, the wave packet for dissociating molecules can be described by a power diffusion pattern of the type $\sigma(t) \propto t^{1/2}$ where σ is the dispersion of the packet. Surprisingly, we could not obtain such a simple power law fit for the dispersion of dissociated atoms.

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