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Quantum interference-induced stability of repulsively bound pairs of excitations[1] LEA SANTOS, Yeshiva University, MARK DYKMAN, Michigan State University — Since the observation in optical lattices of bound pairs of atoms that can exist even in the presence of repulsive interactions, several works have been dedicated to their formation, dynamics and relaxation. Here we discuss the dynamics of two types of bound pairs. One corresponds to doubly occupied sites in one-dimensional Bose-Hubbard systems, the so-called doublons. The other is pairs of neighboring excited spins in anisotropic Heisenberg spin-1/2 chains. We investigate the possibility of decay of the bound pairs due to resonant scattering by a defect or due to collisions of the pairs. We show that the amplitudes of the corresponding transitions are very small. This is the result of destructive quantum interference and explains the stability of the bound pairs.

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