Decay of two repulsively interacting particles

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We study the decay of two repulsively interacting bosons tunneling through a delta potential barrier by direct numerical solution of the time-dependent Schrödinger equation. The solutions are analyzed according to the regions of particle presence: both particles inside the trap (in-in), one particle in and one particle out (in-out), and both particles outside (out-out). It is shown that the in-in probability is dominated by exponential decay, and its decay rate is predicted very well from outgoing boundary conditions. Up to a certain ranges of interaction strength the decay of in-out probability is dominated by the single particle decay mode. The decay mechanisms are adequately described by simple models.