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Lifetimes of three particles in an isotropic harmonic trap[1] ED-MUND MEYER, B.D. ESRY, Department of Physics, Kansas State University — We present an analytic calculation of the energy levels and lifetimes of particles confined by an isotropic harmonic trap. Using a single adiabatic hyperspherical channel, we derive a transcendental equation whose solutions give the energy levels and lifetimes of the trapped states. To obtain a more physical interpretation of the results, we examine two regimes: the oscillator length much greater, and much less than, the two-body s-wave scattering length. For the case of large oscillator length, we find explicit analytical expressions for the lifetime of the trapped states. In particular we find that the lifetime for three identical bosons scales as $|a|^4$, in agreement with previous studies of free-space recombination. Moreover, the decay rate shows resonant enhancements due to Efimov physics just as free space rates do.

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