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Adiabatic Theory of Three Bosons under Transverse Confinement using Hypervectorial Coordinates[1] HYUNWOO LEE, CHRIS GREENE, Purdue University — Anisotropic confinement is used to create low-dimensional quantum gases, and its role in modifying few-body collisions is fundamental for the system's lifetime and stability. Rotational symmetry is broken, so the usual techniques for obtaining adiabatic potentials are not easily applicable. Thus theories involving transverse confinement usually assume a linear geometry. Recently, Zundel *et al.*[1] measured the three-body recombination rates of confined ^{87}Rb and saw a cubic energy dependence near threshold as predicted[2]. Yet questions remain; in particular, isotropic phenomena, such as the first few Efimov trimers, must persist where confinement is weak. We adopt hypervectorial coordinates[3] and derive adiabatic surfaces, from which the adiabatic curves under confinement can be found. We focus on 3 bosons with $J_z = 0$ and show how the even-J^+ curves evolve into a manifold of quasi-1D curves attached to transverse modes, with emphasis on $J = 0$ Efimov potentials that a pure-1D theory does not capture.
[1]L. A. Zundel *et al.*, PRL **122,** 013402 (2019).
[2]N. P. Mehta *et al.*, PRA **76,** 022711 (2007).
[3]S. T. Rittenhouse *et al.*, J. Phys. Chem. A. **113,** 15016 (2009).

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