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Controlling the Interactions of Ultracold Atoms Using Anharmonic Optical Potentials JESSIE HIRTENSTEIN, American Univeristy — Ultracold atoms, when trapped by laser light, interact with each other differently according to the geometry of the potential well in which they are held. We are studying how the shape of a confining potential made of light affects the quantized energy levels of a pair of atoms. We have developed a numerical code that runs on American University's high-performance computing system and found the energies of two atoms by constructing and diagonalizing the Hamiltonian matrix. The simulations allow us to study how the energies change as a function of the trap shape and atom-atom coupling parameter. Our results should find application to laboratory experiments on ultracold atoms, bringing us a step closer to controlling the quantum world.

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