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1D optical lattice of dark spot traps formed by two nested laser beams for atom transport and quantum information applications<sup>1</sup> TRAVIS FRAZER, KATHARINA GILLEN-CHRISTANDL, California Polytechnic State University, San Luis Obispo — One dimensional optical lattices have applications ranging from quantum conveyor belts to quantum computation. Thus far, 1D optical lattices used for this purpose have been limited to trapping atoms in bright spots formed by red-detuned laser light only. Blue-detuned dark spot traps, however, improve coherence times, which allows for more quantum operations before decoherence occurs. There is a lesser known idea that a 1D optical lattice of dark spot traps can be formed using two counter-propagating, blue-detuned laser beams with different beam waists [1]. We will present computational results of our investigation of the properties of these traps both for transporting atoms and performing quantum operations.

[1] P. Zemánek, C.J. Foot, Opt. Comm. 146, 119 (1998)

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