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Optical bichromatic forces for enhancing the number of trapped atoms[1] JOSHUA GROSSMAN, ADAM HAMMETT, Department of Physics, St. Mary's College of Maryland, St. Mary's City, MD, FRANCESCO NARDUCCI, EO Sensors Division, Naval Air Warfare Center - Aircraft Division, Patuxent River, MD
— Many applications of cold, trapped atoms would benefit from an increased number of atoms. Fieldable devices, such as sensors, need to be small. Because the number of trapped atoms scales as the fourth power o f the trapping beam, reducing the size of the laser beams used in a magneto-optical trap leads to a large reduction in the number of trapped atoms. A larger optical force can potentially compensate for the reduction in stopping distance. Bichromatic forces rely on absorption followed by stimulated emission and, as such, they are in principle limited only by laser intensity. While bichromatic forces have been applied for cooling in one dimension, we present here our work toward using bichromatic forces for both cooling and trapping in three dimensions.

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