Abstract Submitted
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A hybrid-trap BEC for radiofrequency-dressed optical lattice experiments[1] NATHAN LUNDBLAD, JOANNA MOODY, Bates College — Recent work in lattice-based ultracold atomic physics has focused on the development of increasingly precise and complex apparatus to push the boundaries of what can be measured with such systems. Historically such experiments have generally been confined to simple-cubic lattices with recent forays into systems both more fertile and more challenging, such as the honeycomb lattice or even the kagome net. We report progress towards nonstandard-geometry optical-lattice experiments using a recently-constructed BEC apparatus at Bates College. We summarize laser system construction, document the design and construction of a spin-flip Zeeman slower, present characterization of the laser cooling process, and present the results of magnetic trapping and evaporative cooling, including recent results showing transfer to a 1064nm fiber-laser dipole trap and the resulting path to BEC. We also report on progress toward observation of adiabatic eigenstates in radiofrequency-dressed spin-dependent lattices loaded from said BEC, and present plans for observations of toroidal Wannier-function lattices. We also present a discussion of other possible nonstandard-geometry lattices that will be explored with this new apparatus.

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