Abstract Submitted
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Sisyphus Optical Lattice Decelerator[1] CHUNCHIA CHEN, SHAYNE BENNETTS, RODRIGO GONZLEZ ESCUDERO, FLORIAN SCHRECK, BENJAMIN PASQUIOU, Institute of Physics, University of Amsterdam, HTTP://WWW.STRONTIUMBEC.COM/ TEAM — We demonstrate a new deceleration scheme that slows and cools atoms without using radiation pressure [1]. This scheme is adapted from proposals originally aimed at laser cooling (anti)hydrogen [2]. In our implementation, atoms are selectively excited to an electronic state whose energy is spatially modulated by an optical lattice. Atoms decelerate only through climbing the potential hill created by the lattice. The ensuing spontaneous decay completes one Sisyphus cooling cycle. We characterize the cooling efficiency of this technique on a continuous beam of Sr, and compare it with radiation pressure based laser cooling. We demonstrate that this technique not only eliminates many of the constraints and limitations of traditional radiation pressure based approaches, it does so while delivering a similar atom number with lower final temperatures. It can also be instrumental in bringing new exotic species and molecules to the ultracold regime. [1] C.-C. Chen *et al.,* arXiv:1810.07157 (2018). [2] S. Wu *et al.*, Phys. Rev. Lett. 106, 213001 (2011).

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