

Abstract Submitted  
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**Uniform synthetic magnetic field and effective mass for cold atoms in a shaken optical lattice.**<sup>1</sup> FERNANDO SOLS, CHARLES E. CREFFIELD, GREGOR PIEPLOW, Universidad Complutense de Madrid, NATHAN GOLDMAN, Université Libre de Bruxelles — Cold atoms can be made to experience synthetic magnetic fields when placed in a suitably driven optical lattice [1]. For coherent systems the switching protocol plays an essential role in determining the long time behavior [2]. Relatively simple driving schemes may generate a uniform magnetic flux but an inhomogeneous effective mass [3,4]. A two-stage split driving scheme can recover a uniform effective mass but at the price of rendering the magnetic field space dependent [5]. We propose a four-stage split driving that generates uniform field and mass of arbitrary values for all driving amplitudes. Finally, we study a modified two-stage split driving approach that enables uniform field and mass for most of but not all values of the magnetic field. [1] N. Goldman, J. Dalibard, Phys. Rev. X 4, 031027 (2014). [2] C. E. Creffield, F. Sols, Phys. Rev. A 84, 023630 (2011). [3] A. R. Kolovsky, Europhys. Lett. 93, 20003 (2011). [4] C. E. Creffield, F. Sols, Europhys. Lett. 101, 40001 (2013). [5] C. E. Creffield, F. Sols, Phys. Rev. A 90, 023636 (2014).

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