Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Magnetostrain-driven quantum engine on a grapheme flake[1] ENRIQUE MUNOZ, Pontificia Universidad Catolica de Chile, FRANCISCO PENA, Pontificia Universidad Catolica de Valparaiso — The concept of a quantum heat engine (QHE) has been discussed [1-3] as an alternative to efficiently recover, on a nanoscale device, thermal energy in the form of useful work. In a QHEN the working substance is in a mixed quantum state determined by a density matrix. Interesting examples of this concept are constituted by photosynthesis in plants as well as human-designed photocells [4]. In this work [1], we propose a graphene-based quantum engine, driven by a superposition of mechanical strain and an external magnetic field. Engineering of strain in a nanoscale graphene flake creates a gauge field with an associated uniform pseudo-magnetic field. The combination leads to the emergence of discrete relativistic Landau levels [1]. The inter-level distance and hence their statistical population can be modulated by quasi-statically tuning the imposed magnetic field along a sequence of reversible transformations that constitute a quantum mechanical analog of the classical Otto cycle. References [1] F. J. Pena and E. Munoz, Phys. Rev. E 91 (2015) 052152. [2] E. Munoz and F. J. Pena, Phys. Rev. E 89 (2014) 052107. [3] E. Munoz and F. J. Pena, Phys. Rev. E 86 (2012) 061108. [4] M. O. Scully, M. S. Zubairy, G. S. Agarwal, and H. Walther, Science 299 (2013) 862.

[1]Financial support from Fondecyt 1141146

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Date submitted: 10 Sep 2015 Electronic form version 1.4