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**Interaction-induced Bloch Oscillation in a Harmonically Trapped and Fermionized Quantum Gas in One Dimension** LIJUN YANG, Key Laboratory of Quantum Information, University of Science and Technology of China, CAS, Hefei, Anhui, 230026, Peoples Republic of China, LIHONG ZHOU, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, WEI YI, Key Laboratory of Quantum Information, University of Science and Technology of China, CAS, Hefei, Anhui, 230026, Peoples Republic of China, XIAOLING CUI, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China — Motivated by a recent experiment by F. Meinert *et al*, arxiv:1608.08200, we study the dynamics of an impurity moving in the background of a harmonically trapped one-dimensional Bose gas in the hard-core limit. We show that due to the hidden “lattice” structure of background bosons, the impurity effectively feels a quasi-periodic potential via impurity-boson interactions that can drive the Bloch oscillation under an external force, even in the absence of real lattice potentials. Meanwhile, the inhomogeneous density of trapped bosons imposes an additional harmonic potential to the impurity, resulting in a similar oscillation dynamics but with a different period and amplitude. We show that the sign and strength of the impurity-boson coupling can significantly affect the above two potentials in determining the impurity dynamics.

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