Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Coherent destruction of tunnelling in laser-graphene interactions DENIS GAGNON, FRANÇOIS FILLION-GOURDEAU, JOEY DUMONT, CATHERINE LEFEBVRE, STEVE MACLEAN, INRS - Centre Énergie-Matériaux-Technologie — Coherent destruction of tunnelling (CDT) is defined as a critical slow-down of the dynamics of a quantum system that occurs when its adiabatic eigenstates exhibit a close avoided crossing. CDT has been observed in several quantum systems such as semiconductor superlattices, superconducting qubits and molecules in laser fields. In this work, CDT in low-dimensional Dirac materials is described using the viewpoint of Floquet theory. More specifically, the case of photo-excited graphene is considered. Conduction band populations are computed for various combinations of incident laser pulse shapes and polarizations. It is shown that these laser parameters provide control knobs over the phenomenon of CDT in graphene. Specifically, multiphoton peaks in momentum space can be selectively suppressed or enhanced. The potential of experimental techniques such as ARPES for the future observation of CDT in graphene is also discussed.

Denis Gagnon
INRS - Centre Énergie-Matériaux-Technologie

Date submitted: 09 Nov 2016 Electronic form version 1.4