Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Transport of polaritons in transition metal dichalcogenide monolayers embedded in a cavity[1] OVIDIU COTLET, ETH - Zurich, EUGENE DEMLER, Harvard University, ATAC IMAMOGLU, ETH - Zurich — We present a theoretical study of the transport properties of Fermi polaron polaritons in monolayer transition metal dichalcogenides, which have been recently realized [1]. Exciton polaritons, resulting from the hybridization of excitons and photons, share the properties of both excitons and photons. It was shown that putting exciton polaritons in contact with a two dimensional Fermi system, the polariton can bind an electron-hole pair from the Fermi sea to form a quasi particle with new properties: the Fermi polaron polariton. Using a Chevy ansatz we investigate the response of this quasi particle to an external low frequency electric field. Although this particle is charge neutral we show that one can associate to it an effective charge. This is because the hole in the Fermi sea, which has a positive charge, has a negative mass: therefore it will move in the same direction as the electron under the influence of the electromagnetic field. We analyze the validity of the Chevy ansatz under the presence of an electric field. We also calculate the effect of disorder on this quasi particle. An interesting question is to what extent the ultra small mass of polaron polaritons influence transport properties. [1] M. Sidler, et. al. Nat. Phys. 2016, doi:10.1038/nphys3949

[1]ERC Advanced investigator grant (POLTDES)

Ovidiu Cotlet
ETH - Zurich

Date submitted: 11 Nov 2016 Electronic form version 1.4