Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Screening effects in $FeSe/SrTiO_3$[1] YUANJUN ZHOU, ANDREW MILLIS, Columbia University — Monolayer films of FeSe grown on $SrTiO_3$ substrates exhibit a significantly higher superconducting transition temperatures (T_c). The enhancement of T_c has been proposed to arise from an interaction of electrons in the FeSe layer with $SrTiO_3$ phonons. We systematically study the electron-phonon interaction in the $FeSe/SrTiO_3$ system, investigate the $SrTiO_3$ longitudinal optical phonon mediated attractive potential, and calculate the electronic screening effect to the random phase approximation level. We find that since the longitudinal phonons live in a wide depletion region in $SrTiO_3$ substrate, they are not effectively screened by the electron fluctuations in the FeSe film. This unscreened attractive potential may induce a high T_c superconductivity. The plasmon and collective mode spectrum is also calculated.

[1]YZ is supported by National Science Foundation under grant No. DMR-1120296. AJM is supported by the Department of Energy under No. DOE-ER-046169.

Yuanjun Zhou
Columbia University

Date submitted: 10 Nov 2016 Electronic form version 1.4