Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Defects and doping in phosphorene[1] ALEXANDRA CARVALHO, ANTONIO CASTRO NETO, National University of Singapore — Defects and doping in phosphorene Most two-dimensional materials are unintentionally doped, due to the growth process or as a result of the interaction with the atmosphere or with other device components. Phosphorene is known to be normally p-type, nevertheless it can be used as a channel material for ambipolar field effect transistors able to operate both in the n- and p-type regimes. In this talk, we analyze how single vacancies and tin can contribute to the p-type conductivity in phosphorene. We will also consider the different stages of interaction with oxygen and how oxygen defects can be stabilized and deactivated. We will suggest how copper and alkali metals can be used to compensate the p-type conductivity or convert it to n-type. Finally, we will suggest how point defects can be used to engineer a sizable spin-orbit splitting in phosphorene, where it is otherwise practically undetectable.

[1]Funded by the Singapore National Research Foundation

Alexandra Carvalho
National University of Singapore

Date submitted: 10 Nov 2016 Electronic form version 1.4