Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Scanning Tunneling Spectroscopy study of the Charge Density Wave driven Mott Insulator $1T$-TaS_2 DOOHEE CHO, CALDES, IBS, POSTECH, Pohang, Korea, YONG-HEUM CHO, Department of Physics, POSTECH, Pohang, Korea, SANG-WOOK CHEONG, Rutgers University, New Jersey, USA, KI-SEOK KIM, Department of Physics, POSTECH, Pohang, Korea, HANWOONG YEOM, CALDES, IBS, POSTECH, Pohang, Korea — Exotic ground states can be generated by competition or interplay between various interactions, such as electron-phonon ($e-ph$), spin-orbit ($s-o$) and electron-electron ($e-e$) coupling. $1T$-TaS_2 is a prime example to study such interplay since a Mott gap coexists with charge density waves (CDW) at low temperatures. Our scanning tunneling spectroscopy measurements with high spatial and energy resolution determine the CDW and the Mott gap as 0.20 – 0.24 eV and 0.32 eV, respectively, by analyzing the phase difference between the real space electron densities across multiple energy gaps. In addition, we observe a peculiar reduction of the Mott gap in the vicinity of defect sites. The effect of competition between $e-ph$ and $e-e$ coupling on the Mott gap size will be discussed within the Hubbard-Holstein picture.

Doohee Cho
CALDES, IBS, POSTECH, Pohang

Date submitted: 14 Nov 2014 Electronic form version 1.4