

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Modulation doping at  $\text{BaSnO}_3/\text{LaInO}_3$** <sup>1</sup> KOOKRIN CHAR, JUYEON SHIN, YOUNG MO KIM, YOUJUNG KIM, Seoul Natl Univ — We recently reported on the conductance enhancement at the interface between two band insulators:  $\text{LaInO}_3$  (LIO) and  $\text{BaSnO}_3$  (BSO). These two-dimensional electron gas-like (2DEG) states at the LIO/ $\text{Ba}_{1-x}\text{La}_x\text{SnO}_3$  (BLSO) polar interface display the stability, the controllability of the local carrier concentration, and the high electron mobility of BLSO. Search for the origin of enhanced conductance at the interface has been carried out, and one of the findings is that the doping level of BSO is a critical parameter for the polar charge contribution. We have also investigated a new modulated heterostructure by inserting an undoped BSO spacer layer at the LIO/BLSO interface. As increasing the thickness of the spacer layer, the carrier concentration and the mobility continually decreased. We attribute the results to the modified band bending as the thickness of the spacer layer varies and to the dislocation-limited transport. However, when we controlled the band bending by field effect, improved mobility was observed in these modulated heterostructures. This new modulated heterostructures of the LIO/BSO polar interface look promising not only for higher electron mobility devices but also for elucidating the mechanism of the 2DEG-like behavior.

<sup>1</sup>Samsung science and technology foundation

Juyeon Shin  
Seoul Natl Univ

Date submitted: 13 Nov 2016

Electronic form version 1.4