

PHYSICS

SEMINAR SERIES

**“Interface doping via the Polarity
Discontinuity in Oxide Heterostructures”**

SPEAKER:
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ABSTRACT:

Recent experiments of Thiel and co-workers (*Science* **313**, 1942-1945 (2006)) observed the steplike change of the interfacial charge density around critical thickness of polar oxide. A polar discontinuity at the abrupt oxide/oxide interface is one of several problems that need to be addressed before one can design the promise of oxide devices. To avoid the so-called polar catastrophe the interface introduces roughening which renders the structure useless, unless the system finds a mechanism for compensating the interface charges. I report a first-principles study by building symmetric slabs consist of SrTiO₃, LaAlO₃ to verify driving mechanism of interfacial charge accumulation within density functional theory. I consider the energetics and electronic structure of the interface, including the role of electric field induced by polarity discontinuity and band offset. In addition I briefly introduce the spin-polarized charge accumulation in artificial heterostructure by utilizing polar catastrophe.

Host: Dr. Byounghak Lee

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