Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Tunneling spectroscopy in Mott insulators, $LaNiO_3$ and $NdNiO_3$: Pseudo gaps and real gaps[1] S. JAMES ALLEN, ADAM HAUSER, EVGENY MIKHEEV, JAMES KALLY, ALEX KOZHANOV, DANIEL OUELLETTE, SUSANNE STEMMER, UC Santa Barbara — To explore the low lying excitations of prototypical charge transfer Mott insulators, we fabricated 4-terminal tunnel junctions and measured the temperature dependent tunnel conductance, along with the sheet resistivity, for $LaNiO_3$ a metal, and $NdNiO_3$ which underwent a metal insulator transition at 125 K. Films were deposited by rf magnetron sputtering on $LaAlO_3$ substrates. At low temperatures the tunneling conductance in $LaNiO_3$ develops a pronounced pseudogap 20 meV wide. $NdNiO_3$ exhibits a pseudo gap above the transition temperature. Just below the transition, the tunnel conductance at 0 bias is strongly suppressed but enhanced at larger bias voltages, signaling a redistribution of the quasi-particle density states as the system enters the insulating phase. At the lowest temperatures the tunnel conductance is suppressed by 4-5 orders of magnitude and a well developed gap appears - 25 meV wide. Comparisons are made with extant optical conductivity as well as recent theories based on Fermi surface instabilities.- SungBin Lee, Ru Chen, and Leon Balents, "Landau Theory of Charge and Spin Ordering in the Nickelates," Phys. Rev. Lett. **106**, 016405 (2011).

[1]Supported: MURI program of the U.S. ARO, W911-NF-09-1-0398, the MRSEC Program of the NSF, DMR 1121053 and utilized the UCSB Nanofab Facility, a part of the NSF-funded NNIN network.

S. James Allen
UC Santa Barbara

Date submitted: 14 Nov 2013 Electronic form version 1.4