



LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

# Joint Experimental and Theory Seminar in Particle Physics and Cosmology:



## Amy Lowitz

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### *Detector and Readout Architectures for mm-wave Cosmology with SPT3G and Beyond*

SPT3G, the third-generation camera for the South Pole Telescope, was deployed in early 2017, with additional upgrades installed in early 2018. It will map the temperature and polarization of the cosmic microwave background at 90, 150, and 220 GHz using an array of  $\sim 16,000$  detectors, a factor of  $\sim 10$  increase compared to the second generation camera. This substantial increase in detector-count required innovations in the scalability of digital frequency multiplexed readout architecture, which will be the main focus of my talk. In particular, I will discuss work to integrate a new, low-inductance SQUID amplifier into the SPT3g readout chain. Additionally, I will touch on more forward-looking work to move the SQUIDs to a sub-kelvin temperature stage. This will afford improvements in parasitics and dynamic range, enabling increased multiplexing factors which will be required for future very high detector-count arrays such as CMB-S4. If time permits, I will also discuss a recent effort to develop a direct-absorbing 100 GHz kinetic inductance detector array as a potential competitor to TESs for large-array CMB polarimetry.



**Monday, February 26, 2018**

**2:30pm**

**301 Physical Sciences Bldg.**