Columbia University Department of Physics

Particle Seminar Series

"THE NA62 EXPERIMENT: RARE KAON DECAYS AT THE CERN SPS"

The flavor-changing neutral-current decays $K \rightarrow \pi\nu\bar{\nu}$ are highly suppressed in the Standard Model, while their rates can be predicted with minimal theoretical uncertainty. The branching ratios for these decays are therefore sensitive probes of the flavor sector of the Standard Model, providing constraints on the CKM unitarity triangle that are complementary to those from measurements of B-meson decays. However, the tiny branching ratios and challenging experimental signatures for these decays make them notoriously difficult to measure. The goal of NA62, an experiment at the CERN SPS, is to detect~ $100 K^+ \rightarrow \pi^+\nu\bar{\nu}$ decays with an S/B ratio of10:1 in two years of data taking starting in 2014. The experiment will make use of the NA48 calorimeter and beamline and a host of new detectors, which are now under construction. In 2007 and 2008, the new collaboration took data with the NA48 detector to measure RK, the ratio of rates for $K \rightarrow e\nu$ to $K \rightarrow \mu\nu$, the value of which could potentially reveal evidence for super-symmetry. After a brief discussion of NA62's measurement of RK , I will describe the physics of the $K \rightarrow \pi\nu\bar{\nu}$ decays and the NA62 measurement strategy and physics program.

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1:00 PM 705 Pupin Hall