

Abstract for an Invited Paper
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**W.K.H. Panofsky Prize in Experimental Particle Physics Talk: Searching for the Rare Decay $K^+ [(\rightarrow \pi)]^+ \nu(\bar{\nu})$
: a Needle in a Haystack**
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Experiments in the 1960's found that strangeness-changing neutral current decays, e.g. $K_L^0 \rightarrow \mu^+ \mu^-$, $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ were suppressed by many orders of magnitude, triggering great theoretical progress including the prediction of three new, heavy quarks: charm, beauty, top. Together with huge advances in accelerators and detectors this opened up a grand new field of flavor physics in the 1980's, including precise calculations for rates of a few special rare K and B decays, and for CP-violating asymmetries. This presentation will focus broadly on the first several years of an experiment at the Brookhaven AGS (E 787), to measure the branching ratio of the extremely rare process $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ with sufficient sensitivity and background rejection to cover the range predicted by the Standard Model of a few times 10^{-10} . It will conclude with brief remarks on similar physics at the B Factories.