

**DISCRIMINATING BETWEEN  $\nu_\mu \leftrightarrow \nu_\tau$  AND  $\nu_\mu \leftrightarrow \nu_{STERILE}$   
IN ATMOSPHERIC  $\nu_\mu$  OSCILLATIONS WITH THE SUPER-  
KAMIOKANDE DETECTOR.**

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A strong body of evidence now exists for atmospheric  $\nu_\mu$  disappearance oscillations. Such disappearance could be explained by oscillations to either  $\nu_\tau$  (due to the high  $\tau$  production threshold) or a "sterile" neutrino ( $\nu_s$ ) that interacts only through such flavor oscillations. Super-Kamiokande uses three different methods to distinguish between these two scenarios. First, matter effects would suppress the  $\nu_\mu \leftrightarrow \nu_s$  oscillation amplitude at high energy. Second, oscillation to  $\nu_s$  would reduce the overall neutral-current neutrino interaction rate. Third, the smoking gun of  $\nu_\mu \leftrightarrow \nu_\tau$  oscillations would be the observation of  $\tau$  appearance resulting from charged-current  $\nu_\tau$  interactions. The results of these three techniques are presented, which strongly favor  $\nu_\mu \leftrightarrow \nu_\tau$  oscillations over  $\nu_\mu \leftrightarrow \nu_s$ .