

The $K^0p \rightarrow K_S p$ process and $K_S p$ Elastic Scattering*

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Recent work by the CLAS Collaboration has pioneered the use of short-lived beams in nuclear physics research. A potentially useful beam particle for such studies is the K_S ; with a mean lifetime of 9.0×10^{-11} s, it travels only a few centimeters before decaying. There is only one previous measurement of this process, which found 36 events. Comparisons of K_S -induced processes with similar K_L -induced processes, which are much more common, will enable an important test of $SU(3)_F$ symmetry. Using only the scattered proton and the products of the $K_S \rightarrow \pi^+ \pi^-$ decay, we reconstruct the $K^0 p \rightarrow K_S p$ process to determine the number of events. A separate analysis of the processes $\gamma p \rightarrow K_S X \rightarrow \pi^+ \pi^- X$ and $\gamma p \rightarrow K_L X \rightarrow \pi^+ \pi^- \pi^0 X$ will be used to determine the incident flux of the beam kaons, and the isolation of the $K_S p \rightarrow K_S p$ process. The angle and momentum of the beam kaon will determine the effective target thickness. Recent analyses of the processes $pp \rightarrow pp$ and $\Lambda p \rightarrow \Lambda p$ suggest that we will be able to observe a signal for this process. Very preliminary analysis of this process indicates the possibility of many more events than presently available in the world data sample. This poster will present the motivation and history of this work, the current status of our analysis, and prospects for the future of this process.

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