A Search for Matter/Anti-Matter Asymmetry in Hyperon Decays

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The primary goal of the fermilab experiment *HyperCP* is to search for CP violation in Ξ^- and $\overline{\Xi}^+$ decays. The search consists of comparing the proton angular distribution in $\Xi^- \rightarrow \Lambda\pi^- \rightarrow \mathrm{p}\pi^-\pi^-$decays to that in the conjugate $\overline{\Xi}^+$decays. The CP violating observable being probed is the asymmetry in the product of parity violating parameters;

$$A_{\Xi\Lambda} = \frac{\alpha_{\Xi}\alpha_{\Lambda} - \alpha_{\bar{\Xi}}\alpha_{\bar{\Lambda}}}{\alpha_{\Xi}\alpha_{\Lambda} + \alpha_{\bar{\Xi}}\alpha_{\bar{\Lambda}}} \ .$$

The data taking ended in January 2000, the experiment having reconstructed over 2.4×10^9 Ξ decays as well as 5.5×10^8 charged kaon and 1.8×10^7 Ω decays. A preliminary study of $A_{\Xi\Lambda}$ at the level of a few $\times 10^{-3}$ based on several percent of the data will be presented. The ultimate goal of the experiment is a sensitivity of 2×10^{-4}. The large data sample also provides access to rare kaon decays and precision measurements of hyperon decay parameters.