

HyperCP Physics Topics

Although the experiment's raison d'être is CP violation in hyperon decays, with such a large data set there is a host of other physics that can be and is being done. These include:

- the search for CP violation in Ξ and Λ decays;
- the search for CP violation in $K^\pm \rightarrow \pi^\pm \pi^+ \pi^-$ decays;
- the search for the lepton-number-violating decay $\Xi^- \rightarrow p \mu^- \mu^-$;
- the search for the $|\Delta S| > 1$ decays: $\Omega^- \rightarrow p \pi^- \pi^-$, $\Omega^- \rightarrow p K^- \pi^-$, $\Omega^- \rightarrow \Lambda \pi^-$, and $\Xi^- \rightarrow p \pi^- \pi^-$;
- the search for the flavor-changing neutral-current decays: $\Omega^- \rightarrow \Xi^- \mu^+ \mu^-$ and $K_s \rightarrow \mu^+ \mu^-$;
- the measurement of the branching ratio of $\Omega^- \rightarrow \Xi^- \pi^+ \pi^-$;
- the measurement of the branching ratios and form factors in the flavor-changing neutral-current decays: $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ and $K^- \rightarrow \pi^- \mu^+ \mu^-$;
- the measurement of the Ω^- and $\bar{\Omega}^+$ α -parameters and the corresponding CP asymmetry;
- the measurement of the Ξ^- β -parameter;
- the measurement of the $\Lambda \pi^-$ strong phase shift;
- the measurement of $\Xi^-(\bar{\Xi}^+)$ and $\Omega^-(\bar{\Omega}^+)$ polarizations in inclusive production;
- the measurement of the $\Xi^-(\bar{\Xi}^+)$ and $\Omega^-(\bar{\Omega}^+)$ production cross sections;
- the search for $K^\pm \rightarrow \mu^\pm \nu \mu^+ \mu^-$ decays.