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