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Hyperon emffactors and CP tests @BESIII

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Abstract content

Hyperons (B) is a powerful diagnostic tool that sheds light on some of the most challenging questions in contemporary physics. One is how and why the strong force confines quarks and gluons into composite systems, e.g. protons. Strange systems probe the strong interaction in the confinement domain which makes hyperons particularly interesting. Electromagnetic form factors (EMFF's) is currently the best way to study hyperon structure. In the time-like region, the EMFF's can be complex with a relative phase. A non-zero phase polarizes the final state even when the initial state is unpolarized. Hyperons have the advantage compared to protons that their polarization is experimentally accessible by the angular distributions of their decay products. A dedicated data sample collected by the BESIII experiment for this purpose, therefore, provides new insights. Those hyperons can be produced in a polarized state makes it possible to simultaneously measure angular distributions of hyperons and anti-hyperons ($\bar{B}$) and test CP symmetry directly. This can be done e.g. via the process $e^+e^- \to J/\Psi \to B\bar{B}$. BESIII has collected the world's largest J/Ψ data sample with an ongoing experimental campaign to further increase the statistics. In addition, due to symmetric, excellent detector conditions and low hadronic background the experiment offers a clean environment for CP-violation tests using $B\bar{B}$. In this talk, I will give an outline of the methods, present the latest results and prospects for the future from the BESIII experiment.

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