

Experimental investigation for diquark degrees of freedom in a charmed baryon at J-PARC

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The concept of diquark degrees of freedom is expected to be essential to describe hadrons in the excited states as well as in the ground states. Since the spin-dependent interaction between quarks is inversely proportional to the masses of the quarks, the extraction of a light-q \bar{q} correlation from baryons with one heavy quark is easier than from those with only light flavors. J-PARC E50 experiment is designed to study a light diquark in a charmed baryon. The experiment will be carried out at J-PARC high momentum beam line using 20 GeV/c pion beam. Charmed baryons are identified by means of the missing mass of the $p(\pi^-, D^{*-})$ reaction. The properties of the light diquark are derived from the systematic measurement of the level structure, production rates and decay branching ratio of charmed baryons. R&D of detectors and a read out system for a high event rate environment, where various reaction channels including both charm and strange sectors can be studied, is in progress. In this contribution, an overview of the physics program and the experimental setup of J-PARC E50 will be presented.

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