Hypernuclei and strangeness physics programme at J-PARC

Tomofumi Nagae[1]*
[1]*Department of Physics, Kyoto University, Kitashirakawa, Kyoto – 606-8502, JAPAN*
* *email: nagae@scphys.kyoto-u.ac.jp*

The construction of Japan Proton Accelerator Research Complex (J-PARC) is completed in 2009. The J-PARC accelerators consist of a 181-MeV proton linac, a 3-GeV rapid-cycling proton synchrotron, and a 50-GeV main proton synchrotron. Now, the 3-GeV proton beam is used to produce spallation neutrons and slow muons for materials and life sciences. The 30-GeV proton beam from the main ring is used to produce high-intensity kaon beams and neutrino beam.

Beam commissioning of the slow-extraction beam from the J-PARC main proton synchrotron started in January, 2009. The beam was successfully extracted and transported to the Hadron Experimental Hall on January 27. The first secondary-beam production was confirmed on February 11 at the K1.8-branch beam line in the hall. Although we need a lot of work to be completed before the beam would be available for experimental users, we believe this is the start of the J-PARC era to open new research fields in strangeness nuclear physics.

The K^- beams with the highest intensity in the world enable us to carry out various interesting experimental subjects; the (K^-,K^+) missing-mass spectroscopy to discover hypernuclei, hypernuclear gamma-ray spectroscopy, search for kaonic nuclei, and so on. New detector systems such as the SKS+ spectrometer, Hyperball-J detector, and Cylindrical Detector System (CDS) are now in preparation. Present status of the experiments, our initial physics goals at J-PARC and the perspectives are discussed.