

RIKEN's activity at J-PARC Hadron Hall

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J-PARC has been founded to accommodate wide range of scientific fields utilizing high intensity proton accelerator research complex, as a joint project between KEK (High energy accelerator research organization) and JAEA (Japan atomic energy agency). One of the research objective of J-PARC is the fundamental physics using slow-extracted 30 GeV proton beam to the Hadron Hall bombarding on the fixed nuclear target, and delivering variety of secondary particles, such as π^\pm , K^\pm , K^0 and \bar{p} . The intensity of the proton beam is ~ 20 kW at present, and it is keep improving towards its design value of few 100 kW.

RIKEN's research groups have been committed several research programs at K1.8BR kaon beam line and High-p primary proton beam line of J-PARC Hadron Hall. In both cases, we are focused on the study of meson property change in nuclear medium. The K1.8BR spectrometer system is equipped with large neutron counter system in the forward angle. Using this unique feature, we are running E15 experiment for deeply bound kaonic nuclear state search using ${}^3\text{He}(K^-, n) < K^-pp >$ reaction, and preparing E31 for the study of $\Lambda(1405)$ using $d(K^-, n)\Lambda(1405)$ reaction. We are also preparing several experiments using \bar{p} beam at K1.8BR by upgrading our experimental apparatus. At High-p line, we are preparing E16 for the study of in-medium mass shift of ϕ mesons in nuclei via the invariant-mass spectroscopy of e^+e^- -pair using $A(p, e^+e^-)X$ reaction. Very recently, the construction budget of High-p line had been approved, and will be constructed within two years. On the other hand, the size of the J-PARC Hadron Hall is still quite limited compared to the facility scale. Therefore, cooperating with KEK Hadron group and Hadron Hall users association (HUA), we established our design proposal how to extend the Hadron Hall to fulfill next generation experimental programs as shown in the figure.

In this paper, we will describe some of the results of our present experiments, and overview the Hadron Hall extension plan.

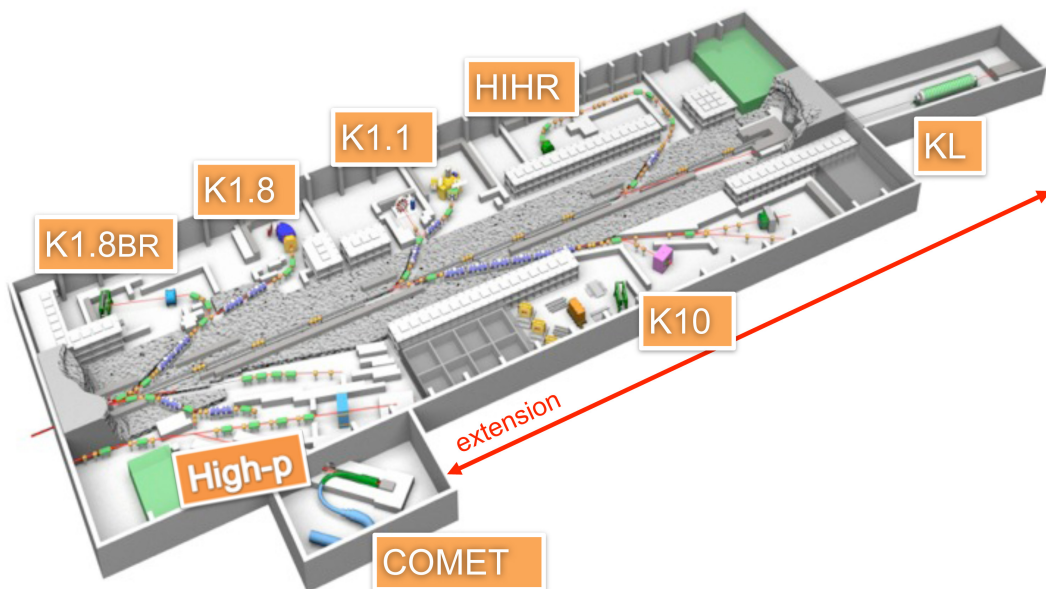


Figure 1: Schematic figure of the J-PARC Hadron Hall extension plan.