

— outline for the WG discussions —
Kaon Rare Decay Experiments @NP08

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In the J-PARC Phase 1, we plan to build a K_L^0 beam-line and a low-momentum K^+ beam-line sharing the common T1 target, and start the program of kaon decay experiments. These beam-lines, however, are not optimized to achieve the ultimate physics goals. For example, the Phase 1 neutral beam-line does not deliver enough number of K_L^0 's to measure $Br(K_L^0 \rightarrow \pi^0 \nu \bar{\nu})$ with a precision of $<10\%$.

In this workshop, **the working group discussions will be focused on developing the plan of the J-PARC kaon experiments in the next step.** Both K_L^0 ($K_L^0 \rightarrow \pi^0 \nu \bar{\nu}$, ...) and K^+ (T violation in $K^+ \rightarrow \mu^+ \pi^0 \nu$, $K^+ \rightarrow \pi^+ \nu \bar{\nu}$, ...) experiments, including fresh ideas of brand-new experiments, will be covered. Contributions on the theoretical aspects of kaon physics are also welcome.

As the baseline of the discussion, **we assume that a) the full intensity of the Phase 1 slow extraction with 30GeV protons is realized, and b) we construct dedicated beam-line(s) in the existing or extended Hadron Hall.** Here are the issues to be worked out.

1. What subjects are we going to study, in the Phase 1 experiments, to develop the Phase 2 plan ?
2. On the beam-line:
 - What proton beam do we request to the Main Ring ?
 - 50GeV ? more intensity ? duty factor ? spill structure ? ...
 - What facility do we request for Phase 2 ?
 - extension of Hadron Hall, new primary beam (B-line), ...

- What beam-line (kaon flux and purity) do we construct ?
 - new target station, extraction angle, length, collimation, DC separation, focusing, ...
- 3. On the detector:
 - What detector improvements do we need ?
 - acceptance, background rejection, rate capability, ...
 - Will we use a new technique or concept of the detector ?
 - γ angle measurement, new photo-sensors, ...
- 4. Aren't we missing any good ideas to be pursued ?
 - lower proton energy ?
 - micro-bunched beam for Time-Of-Flight technique ?
 - large extraction angle ?
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The goal of this workshop is to demonstrate to the community of Nuclear and Particle physics as well as to the accelerator people, that we are going to realize the ultimate kaon-decay experiments at J-PARC with the super beam-lines beyond Phase 1.