

Development of scintillation counter system for highly intense pulsed muon beam, fabricated in new muSR spectrometer at RIKEN-RAL

Muons are used as sensitive probes to explore various matters in condensed matter physics and chemistry by the muSR technique (muon spin rotation, relaxation and resonance). In this method, angular distribution of positrons from muon decays is observed to probe the distribution and fluctuation of local magnetic field in matter.

In the case of highly intense muon beam at the RIKEN-RAL muon facility in UK, an instantaneous decay positron rate is so high that a time spectrum might be distorted due to pile-up of signals produced by positrons sequentially hit a counter. In addition, the counters should be compact because it should be mounted in a very narrow space at the bore of Helmholtz magnets. For these purposes, we developed a new counter system to fabricate the new muSR spectrometer. It is composed of a thin and spindle scintillator to increase the segments and direction-sensitivity, wave-length shifting fibers, clear fibers and multi-anode photomultiplier tube (MAPMT) capable of operating MAPMT remote from the magnetic field flexibly and mounting 606 scintillators and light-guide in the narrow space. This method enables us to reduce distortion and background detection, promising to observe the time spectrum more accurately in the muSR method.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

My speciality is particle and nuclear physics using low energy muons, related detector development and beam application such as the muSR spectrometer.

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