

# Assembly and Bench Testing of a Spiral Fiber Tracker for the J-PARC TREK/E36 Experiment

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This paper presents recent progress in developing a spiral fiber tracker for use in the E36 experiment scheduled to be performed at J-PARC. This positive kaon decay experiment uses the “stopped kaon” method to search for physics beyond the standard model through precision measurements of lepton flavor universality, and searches for heavy sterile neutrinos and dark photons [1]. For this experiment, we plan to upgrade the present KEK E246 detector system [2] (which is based on the super-conducting toroidal spectrometer previously used at KEK) to a new TREK detector system. The tracking and identification of charged particles from kaon decays (positive muons and positrons) are of importance in achieving high precision measurements. One of the tracking devices, the spiral fiber tracker, which is presently under development, will consist of four ribbon layers, each containing 1-mm-diameter double-clad plastic scintillating fibers (SCSF-78, Kuraray Co., Ltd.) in two helicities, wrapped around the kaon stopping target in the TREK detector. Scintillation photons are read out by multi-pixel photon counters connected to the scintillating fibers with clear fibers. We will use the tracker, in combination with the existing three layers of multi-wire proportional chambers, to measure the momentum and detection efficiency of the charged decay particles. Herein, we report on the assembly of the spiral fiber tracker, and on the results of bench measurements of the charged particle detection efficiency.

## References

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