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## Development of a thin-wall straw-tube tracker for COMET experiment

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The COMET experiment at J-PARC aims to search for the charged lepton flavor violating process of neutrinoless muon to electron conversion with an improvement of a sensitivity by a factor of 10000 to the current limit, in order to explore the parameter region predicted by most of well-motivated theoretical models beyond the Standard Model. When the muon to electron conversion occurs, almost all the energy of the muon mass is carried out by the electron which is expected to have the monochromatic energy of about 105 MeV. The experiment requires to detect such electron with an excellent momentum resolution, better than 200 keV/c, in order to achieve the goal sensitivity. Thus the very light material detector which is operational in vacuum is indispensable. On the basis of the requirement, we have developed the thin-wall straw-tube tracker which is operational in the vacuum and constructed by the extremely light material. The prototype straw-tube tracker has been developed, which consists of 9.8 mm diameter tube, longer than 1 m length, with 20  $\mu\text{m}$  thickness Mylar foil and 70 nm aluminum deposition, and its performance evaluation using radioactive source, cosmic ray, and electron beam has been performed. In this presentation, we report the detail of the performance evaluation of the prototype tracker. The prospect of final detector design is also described.

### Experimental Collaboration

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