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A High-Precision, Fast, Robust, and Cost-Effective Muon Detector Concept for the FCC-ee

We propose a high-precision, fast, robust and cost-effective muon detector concept for an FCC-ee experiment. This design combines precision drift tubes with fast plastic scintillator strips to enable both spatial and timing measurements. The drift tubes deliver two-dimensional position measurements perpendicular to the tubes with a resolution around 100˜μm. Meanwhile, the scintillator strips, read out with the wavelength-shifting fibers and silicon photomultipliers, provide fast timing information with a precision of 200˜ps or better and measure the third coordinate along the tubes with a resolution of about 1˜mm.

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