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The Search for Charged Lepton-Flavour Violation with the Mu3e Experiment

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The Mu3e experiment will search for the charged lepton-flavour violation decay of the muon into two positrons and one electron. With a vanishingly small branching ratio in the Standard Model, any observation of this process will be clear evidence for new physics. A first phase of the experiment aiming for a single event sensitivity of one in $2 \cdot 10^{15}$ muon decays is currently under construction at the $\pi E5$ secondary muon beam-line area at the Paul Scherrer Institute. To achieve the envisioned sensitivity, we are building a low-mass pixel tracker complemented by timing detectors surrounding a muon target to reconstruct the full kinematics of candidate $\mu^+ \rightarrow e^+ e^+ e^-$ events. An online FPGA- and GPU-based filter farm allows us to process over 10^8 muon decays per second. With all detector prototypes meeting specifications, sub-detectors are being constructed and integrated in the experimental apparatus during the ongoing engineering runs. In this presentation we report on the current status of the experiment, and our plans towards full detector commissioning and first physics data taking in two years from now.

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