

Abstract Submitted
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Leak Rate Test for a Fiber Beam Monitor Contained in a Vacuum for the Muon g-2 Experiment¹ BRIDGET O'MARA, NOEL LANE, EISEN GROSS, FREDERICK GRAY, Regis University, MUON G-2 COLLABORATION — The muon g-2 experiment at Fermilab aims to measure the muon anomalous magnetic moment with a precision of 0.14 parts per million (ppm). The measurement will build on the Brookhaven-based E821 experiment, which yielded results suggesting new physics such as supersymmetry. The Fiber Beam Monitors (FBMs) are used in the experiment to determine the position and observe the motion of a muon beam and monitor the properties of the beam over time. The FBMs support a $9\text{ cm} \times 8\text{ cm}$ “harp” with 7 scintillating fibers separated from each other by 13 mm, each with a diameter of 0.5 mm. The experiment requires a vacuum of less than 1×10^{-6} Torr to prevent trapping of electrons ionized from the residual gas by the electrostatic quadrupoles. To meet this requirement the FBMs must have a leak rate of less than 5×10^{-5} Torr L/s. We have constructed a vacuum system to simulate these conditions and have determined the leak rate of the FBMs within the constructed vacuum apparatus. This leak rate will be reported, along with preliminary results from tests of the light output from the scintillating fibers.

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