

Abstract Submitted  
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**Improving Measurements of Beam Dynamics for Fiber Harp System in Muon  $g-2$  Experiment**<sup>1</sup> DAT TRAN, FREDERICK GRAY, Regis University, MUON G-2 COLLABORATION — The Muon  $g-2$  experiment at Fermi National Accelerator Laboratory will improve the precision with which the muon’s anomalous magnetic moment is known from 540 ppb to 140 ppb. “Fiber harp” beam monitoring devices provide a measurement of the time dependence of the muon beam’s vertical and radial profiles by using scintillating fibers. The fiber harps measure the betatron tune (ratio of the betatron to cyclotron frequency) as a function of momentum. These measurements are crucial to understand the coherent betatron oscillation (CBO), which is a source of systematic error in the measurement of the muon spin precession. Furthermore, these measurements allow us to validate beam dynamics predictions from simulation models. Improvements in methods of extracting cyclotron and betatron frequencies as well as a better understanding of the uncertainties in extracting those frequencies will be presented.

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