

## Feasibility Studies for an Inclusive $R$ -Measurement using ISR with BESIII

*Tuesday, 17 October 2023 16:35 (3 minutes)*

The hadronic vacuum polarization is an important contribution to the running QED coupling constant at the  $Z$  pole,  $\alpha_{\text{QED}}(M_Z^2)$ , and the anomalous magnetic moment of the muon  $a_\mu = (g_\mu - 2)/2$ . Both quantities allow for precision tests of the Standard Model (SM). Their theoretical uncertainties are dominated by hadronic contributions. Experimental inputs, like the hadronic  $R$  value, are used in dispersive approaches to calculate these quantities.

The large data sets collected at the BESIII experiment at the  $e^+e^-$  collider BEPCII in Beijing, China, offer an excellent environment for initial state radiation (ISR) measurements. This poster discusses the feasibility of using the ISR technique to measure  $R_{\text{had}}$  inclusively in a continuous spectrum compared to the established scan technique. This is crucial given the standing  $5.1\sigma$  discrepancy between the experimental world average of  $a_\mu$  and the SM prediction of the Muon  $g - 2$  Theory Initiative and allows for an independent perspective on the existing tensions within hadronic cross section measurements in  $e^+e^-$  and between dispersive and Lattice QCD evaluations.

### Parallel Session

Poster Session

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