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Small Angle Initial State Radiation Analysis of the Pion Form Factor at BESIII

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The anomalous magnetic moment of the muon $a_\mu = (g_\mu - 2)/2$ is one of the most precisely measured quantities in modern physics. However, there is a sizable discrepancy between the Standard Model (SM) prediction of the Muon $g-2$ Theory Initiative and the experimental average of the latest direct measurements at BNL and FNAL. This discrepancy is known as the Muon $g-2$ puzzle. For the SM prediction the main uncertainty arises from hadronic contributions and can be improved systematically using measurements of hadronic cross sections at e^+e^- colliders. One of the most important processes is $e^+e^- \to \pi^+\pi^-$. Using a data set of $1.9\,\mathrm{fb}^{-1}$ (in the near future $20\,\mathrm{fb}^{-1}$) at a center of mass energy of $3.77\,\mathrm{GeV}$, the $\pi^+\pi^-$ cross section is measured at the BESIII experiment located at the BEPCII collider in Beijing, exploiting the initial state radiation technique at small angles. The analysis aims to determine the pion form factor at masses above $0.8\,\mathrm{GeV}$, which is also interesting for hadron spectroscopy. The presentation will discuss the current status of this work.

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