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Measurement of e^+e^- to hadrons cross sections with BABAR and implications for the muon g-2

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The BABAR Collaboration has an intensive program studying hadronic cross sections in low-energy e^+e^- annihilations, which are accessible with data taken near the Υ(4S) via initial-state radiation.
Our measurements allow significant improvements in the precision of the
predicted value of the muon anomalous magnetic moment. These improvements are necessary for shedding light on the current ˜3 sigma difference between the predicted and the experimental values. We have previously published results on a number of processes with two to six hadrons in the final state.
Currently, the largest uncertainty on the calculation of the hadronic contribution in the energy region between 1 and 2 GeV stems from the
$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$ cross section.
A new precise measurement of this process is presented here, together with measurement of other low-multiplicity channels, such as $e^+e^- \to \pi^+\pi^-\eta$.

We also present the first measurements of the $e^+e^- \to K_S K_L \pi^0$, $K_S K_L \eta$ and $K_S K_L \pi^0\pi^0$ cross sections, and the study of their intermediate resonance structure, using 469/fb of data collected with the BaBar detector at SLAC. Initial-state radiation events are also used to study the processes $e^+e^- \to K_S K^+\pi^-\pi^0$ and $K_S K^+\pi^-\eta$, and their intermediate states.

Experimental Collaboration

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