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Study of low-energy e+e– annihilation into hadrons at BABAR

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The measurement of exclusive e^+e^- to hadrons processes is a significant part of the physics program of the $BABAR$ experiment, aimed to improve the calculation of the hadronic contribution to the muon $g-2$ and to study the intermediate dynamics of the processes. We present the most recent studies performed on the full data set of about 470 fb^{-1} collected at the PEP-II e^+e^- collider at a center-of-mass energy of about 10.6 GeV. In particular, we report the results on e^+e^- annihilation into three pions in an energy range from production threshold up to about 4 GeV. From the fit to the measured 3π mass spectrum we determine the products $\Gamma(V \to e^+e^-)calB(V \to 3\pi)$ for the ω and ϕ resonances, and $calB(\rho \to 3\pi)$. The latter isospin-breaking decay is observed with 6 sigma significance. The measured $e^+e^- \to \pi^+\pi^-\pi^0$ cross section is used to calculate the leading-order hadronic contribution to the muon magnetic anomaly from this exclusive final state with significant improved accuracy.
We also present a measurement of the cross section for three $e^+e^- \to 2K\,3\pi$ processes, together with the study of the many intermediate states. In particular we find hints for a new possible decay of the recently discovered $\phi(2170)$ resonant state.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

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