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Measurement of hadronic cross sections at CMD-3

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Summary

The CMD-3 experiment at the VEPP-2000 collider in Novosibirsk carries out a comprehensive study of the exclusive cross-sections of $e^+e^- \rightarrow$ hadrons in the center-of-mass energy range from the threshold to $2E < 2$ GeV. The CMD-3 results provide an important input for calculation of the hadronic contribution to the muon anomalous magnetic moment. Currently there are world-wide efforts to improve the accuracy of this calculation to match the expected precision of the new experiment at Fermilab to measurement of muon $(g-2)$, now taking data. The best precision is still achieved by integrating the measured total cross-section of $e^+e^- \rightarrow$ hadrons. The calculation is strongly dominated by low-energy data, in particular, by data at $2E < 2$ GeV. Other interesting topics of the CMD-3 physics program include a study of hadron cross-sections at the nucleon-antinucleon threshold and a search for two-photon production of C-even resonances.

The energy scan of the whole energy range was performed in 2011-2013 and, after detector and collider upgrade and increase in luminosity by factor 2-3, in 2017-2019. The total luminosity integral collected so far is 200 $1/\text{pb}$. Here we present the survey of results of data analysis, including various modes of electron-positron annihilation with up to seven pions or two kaons and pions in the final state.

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