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Separation of e^+e^- to e^+e^- and e^+e^- to $\pi^+\pi^-$ events based on the difference in the energy deposition profiles in SND detector calorimeter.

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Content

The technique of discrimination of the $e^+e^- \rightarrow e^+e^-$ and $e^+e^- \rightarrow \pi^+\pi^-$ events in energy range $0.5 < \sqrt{s} < 1$ GeV based on the difference in the energy deposition in calorimeter of SND detector was developed by applying machine learning method. In particular the following parameters are used: 0E_j is the energy deposition in j th layer of the tower with the maximal energy deposition, 1E_j is the sum of energy depositions in j th layer of eight towers that surround the tower with the maximal energy deposition, 2E_j is the sum of energy depositions in j th layer of the other towers of the cluster ($j = 1, 2, 3$). Identification efficiency for $e^+e^- \rightarrow e^+e^-$ and $e^+e^- \rightarrow \pi^+\pi^-$ events is estimated to be in the range from 99.3 to 99.8 %. Contribution of the identification efficiencies errors to the total error of $e^+e^- \rightarrow \pi^+\pi^-$ cross section is less than 0.2% for the most energy points.

Summary

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