

Preliminary results on $e^+e^- \rightarrow \text{hadrons}$ from SND detector at VEPP-2000 collider

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Preliminary results on $e^+e^- \rightarrow 3\pi, 4\pi, \omega\pi^0, \eta\pi^+\pi^-, n\bar{n}$ cross sections measured with SND detector at VEPP-2000 collider are reported. The data were collected in 2010–2011 in the energy range $2E = 1.0\text{--}2.0$ GeV, the total integrated luminosity used is about 7 pb^{-1} .

Spherical Neutral Detector (SND) [1] is a general purpose non-magnetic detector for experiments at electron-positron collider VEPP-2000 [2] in Novosibirsk in the c.m. energy range $2E = 0.4\text{--}2.0$ GeV. Experiments at VEPP-2000 with SND and Cryogenic Magnetic Detector (CMD) begun in 2010. In 2010 and 2011 two scans of the energy range $2E = 1.0\text{--}2.0$ GeV (MHAD2010 and MHAD2011) were performed with the integrated luminosity of 5 and 25 pb^{-1} , respectively.

Preliminary results on some $e^+e^- \rightarrow \text{hadrons}$ cross sections are presented in Fig. 1. Cross sections of $e^+e^- \rightarrow \pi^+\pi^-\pi^0, \pi^+\pi^-\pi^0\pi^0, \omega\pi^0 \rightarrow \pi^0\pi^0\gamma$ and $\eta\pi^+\pi^-$ are measured using the data of MHAD2010 experiment. In the $e^+e^- \rightarrow \pi^+\pi^-\pi^0$ cross section, the $\omega(1420)$ and $\omega(1650)$ resonances are seen. The cross section of $e^+e^- \rightarrow \pi^+\pi^-\pi^0\pi^0$ is dominated by the $\rho(1450)$ and $\rho(1700)$ decays. The fit to the $e^+e^- \rightarrow \omega\pi^0$ cross section data takes into account contributions from the $\omega(782)$ and $\omega(1450)$ resonances. The cross section of $e^+e^- \rightarrow \eta\pi^+\pi^-$ is dominated by the $\rho(1450) \rightarrow \eta\pi^+\pi^-$ decay.

The $e^+e^- \rightarrow n\bar{n}$ cross section is measured on the part of MHAD2011 statistics, about 2.5 pb^{-1} . The detection efficiency is about 30 %. The $e^+e^- \rightarrow p\bar{p}$ and $\gamma\gamma$ background contributions are subtracted. Fitting the cross section with a step function yields $\sigma = 0.1 \pm 0.2 \text{ nb}$ below the threshold and $\sigma = 0.8 \pm 0.2 \text{ nb}$ above the threshold. All quoted errors are statistical. The sources of systematic uncertainties are being analyzed.

Future SND plans at VEPP-2000 include a scan of the full energy range $2E = 0.4\text{--}2.0$ GeV and the analysis of other $e^+e^- \rightarrow \text{hadrons}$ processes such as $e^+e^- \rightarrow K_S K_L, KK\pi, p\bar{p}$.

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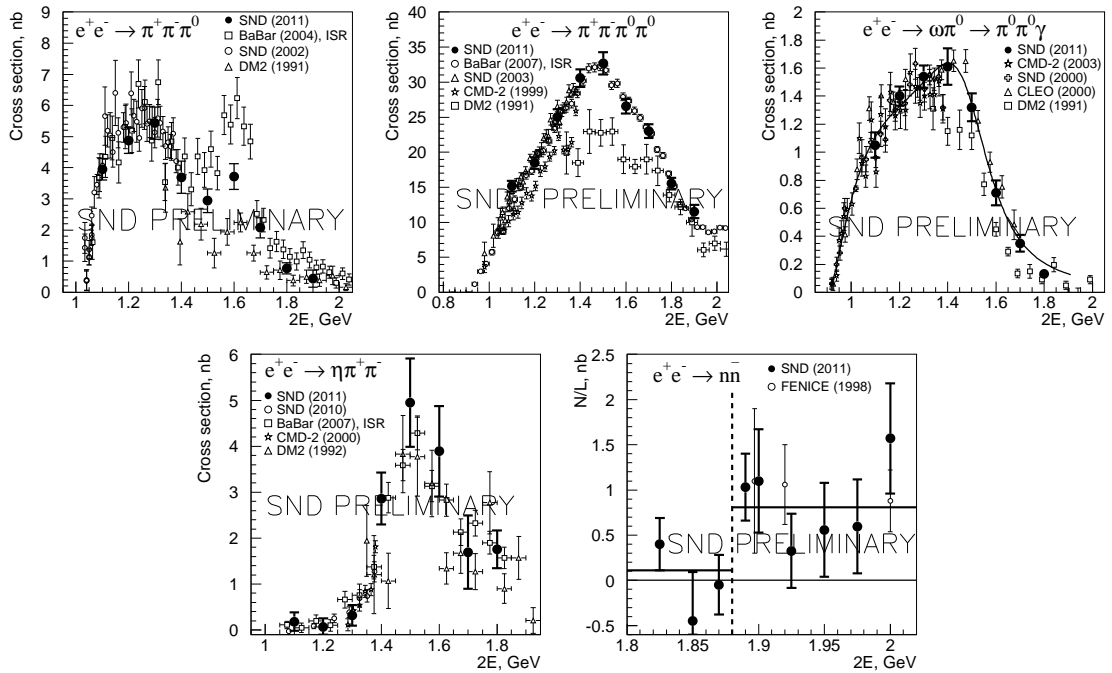


Figure 1: Cross sections measured with SND at VEPP-2000, in comparison with previous measurements.

Acknowledgments

This work is partially supported by the Russian Federation Presidential Grant for Scientific Schools NSh-6943.2010.2, Russian Fund for Basic Research Grant 11-02-00276-a and the Grant 14.740.11.1167 of Federal Program “Scientific and Pedagogical Personnel of Innovative Russia”.

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