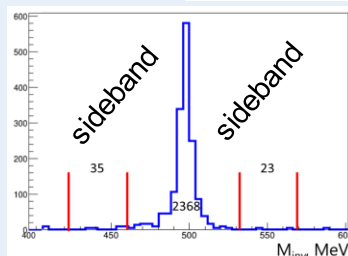
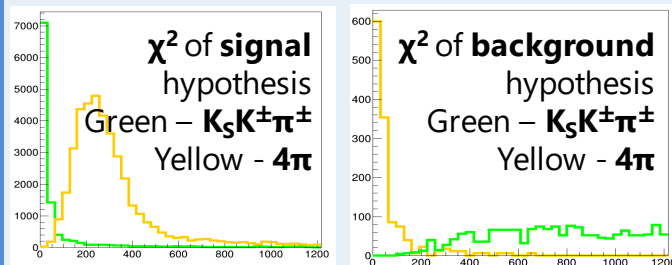
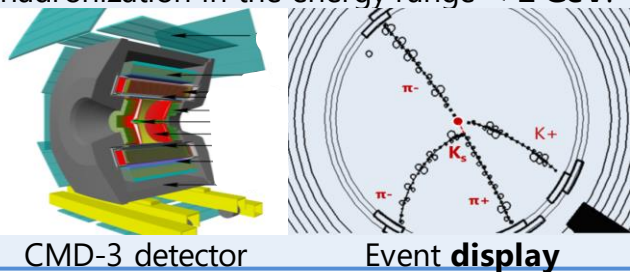


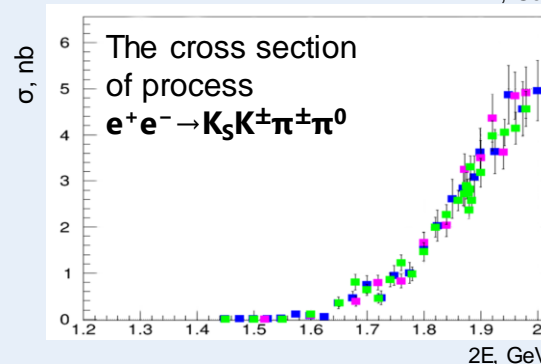
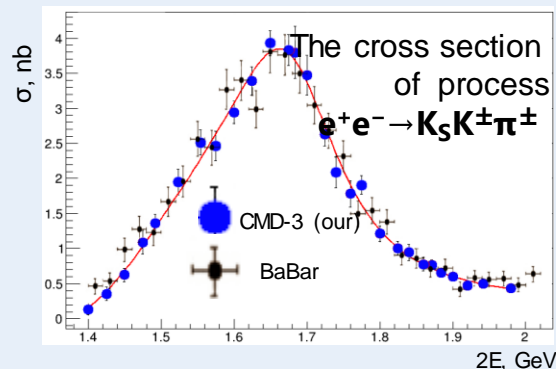
# Study of the process $e^+e^- \rightarrow K_S K^\pm \pi^\pm$ and $K_S K^\pm \pi^\pm \pi^0$ with CMD-3 detector

**Abstract:** Analysis of the  $e^+e^- \rightarrow K_S K^\pm \pi^\pm$  process is based on 6019 events. Resulting in improved  $\phi'$  meson parameters. Here, preliminary results of the cross section of the process  $K_S K^\pm \pi^\pm \pi^0$  are presented too.

**Introduction:** The main physical program of the CMD-3 detector [1] at the  $e^+e^-$  collider VEPP-2000 is the precise measurement of the hadronic cross-sections. These are crucial for calculation of  $(g-2)$  of muon in Standard model frame and for description of quark hadronization in the energy range  $< 2$  GeV.



Invariant mass of  $K_S$  after kinematic fit



## Results

We measured the cross section of  $e^+e^- \rightarrow K_S K^\pm \pi^\pm$ , selecting 6019 events. The previous BaBar result [2] – 3860 events. According to the simulation, the main physical background comes from  $4\pi$  channel. After analyzing possible sources and applying corrections, the total systematic error of 3.7% was achieved.

We proved an assumption from earlier works [2] that **neutral  $K^*K$  dominates** dynamics.

	$\Gamma_{ee}^{e^+} Br_{KK^*(892)}^{e^+}(eV)$	$M_{\phi'}(MeV)$	$\Gamma_{\phi'}(MeV)$
This paper	$105 \pm 17 \pm 13$	$1495 \pm 26 \pm 15$	$361 \pm 29 \pm 18$
CMD-3	-	$1502 \pm 11$	$315 \pm 27$
BaBar	$129 \pm 15$	$1508 \pm 19$	$418 \pm 26$
PDG	-	$1465 \pm 25$	$400 \pm 60$

	$\Gamma_{ee}^{e^+} Br_{KK^*(892)}^{e^+}(eV)$	$M_{\phi'}(MeV)$	$\Gamma_{\phi'}(MeV)$
This paper	$374 \pm 80 \pm 29$	$1699 \pm 7 \pm 11$	$207 \pm 26 \pm 15$
CMD-3	-	$1667 \pm 5 \pm 11$	$176 \pm 23 \pm 38$
BaBar	$367 \pm 50$	$1709 \pm 19$	$325 \pm 68$
PDG	-	$1680 \pm 20$	$150 \pm 50$

The accuracy of our  $e^+e^- \rightarrow K_S K^\pm \pi^\pm$  cross-section improves value of  $\phi'$  hadron mass.

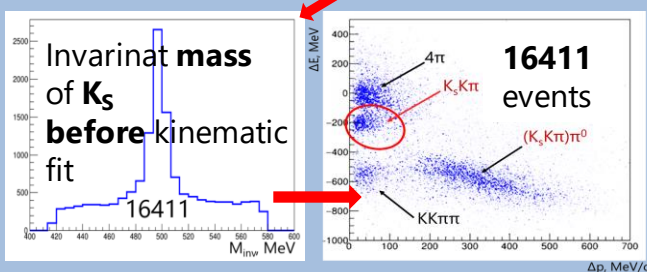
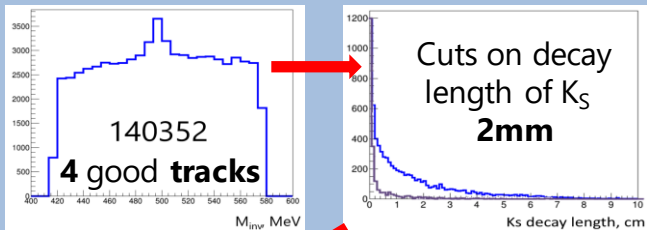
## Conclusion

We designed selection criteria to extract signal events and applied analysis based on event distribution on  $dE:dp$  2D-plot [3]. Using **two-staged** kinematic fit we reduced the background to the level of 3%. Our results agree with BaBar. Also, we firstly present the preliminary result of the cross section measurement of  $K_S K^\pm \pi^\pm \pi^0$  process.

The knowledge amassed at CMD-3 clarifies how the **quarks** unite into **hadrons**.

These measurements will refine the accuracy of the **hadronic** contribution to the anomalous magnetic moment of the muon.

## Selection criteria cuts:



## References Cited

- [1] B I Khazin et al., Nucl. Phys. B, Proc. Suppl.376,181 (2008)
- [2] B Aubert, BaBar collaboration, PhysRevD.77.092002 (2008)
- [3] A A Uskov et al., Phys. Scr. 95 104002 (2020)