

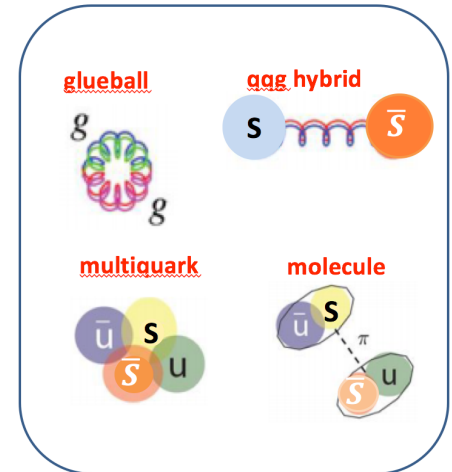
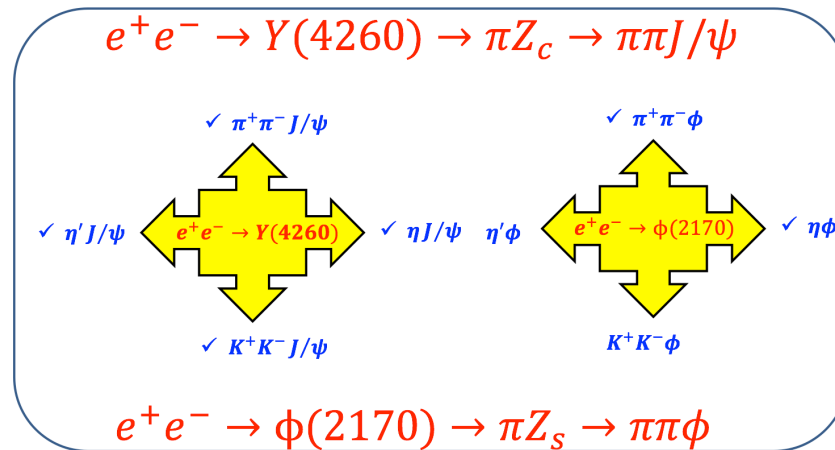
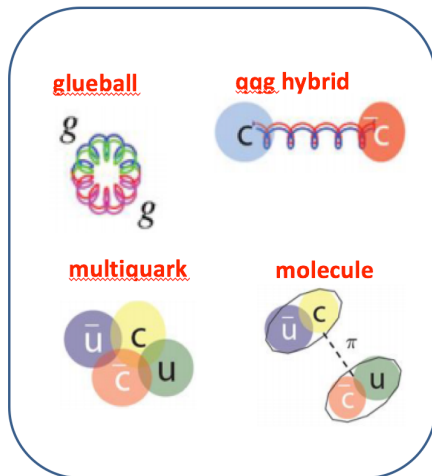
Measurements of $e^+e^- \rightarrow \phi K^+ K^-$ and $K^+K^- K^+K^-$ cross sections

(R-Scan Data: $\sqrt{s}=2.0\text{GeV}\sim 3.08\text{GeV}$)

Preliminary results

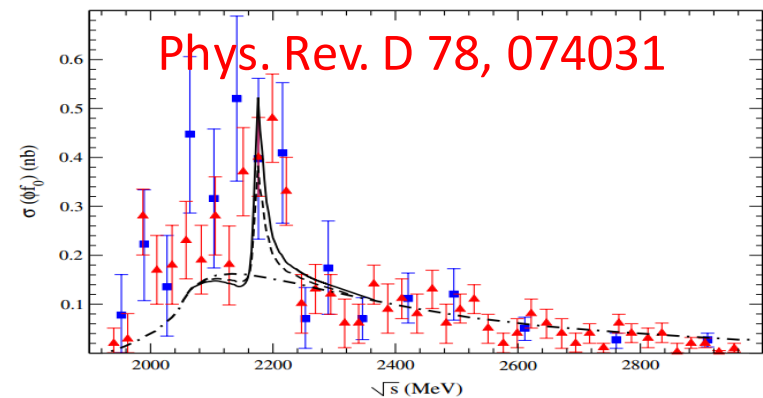
Motivation

- ❖ The states with $J^{PC} = 1^{--}$ include $\phi(2170)$, $\rho(2150)$ and so on. $\phi(2170)$ is interpreted as a $s\bar{s}g$ hybrid; a $2^3D_1 s\bar{s}$ state; or a $s\bar{s}s\bar{s}$ tetraquark state.



- ❖ Theorists have predicted a neat resonance peak around 2.150 GeV in the three-meson system ϕK^+K^- (the solid). Experimental data is from BABAR Collaboration.

$$e^+e^- \rightarrow Y(2175) \rightarrow \phi f_0(980) \rightarrow \phi K^+K^-$$

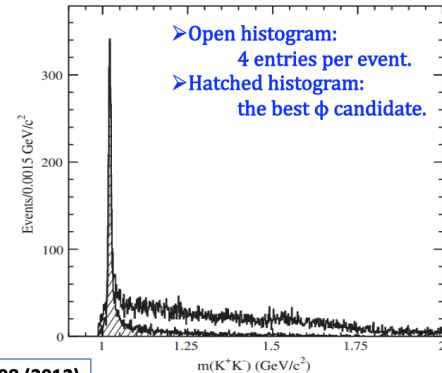
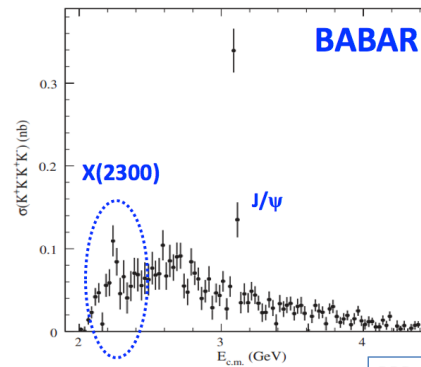


Motivation

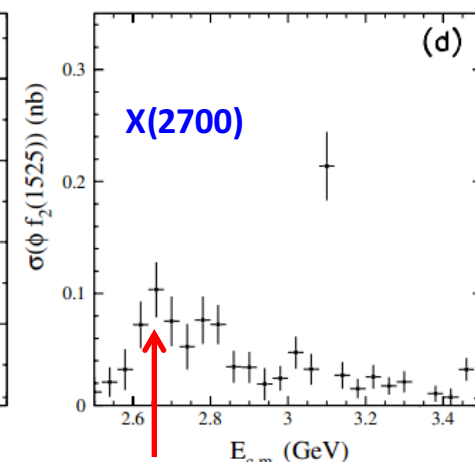
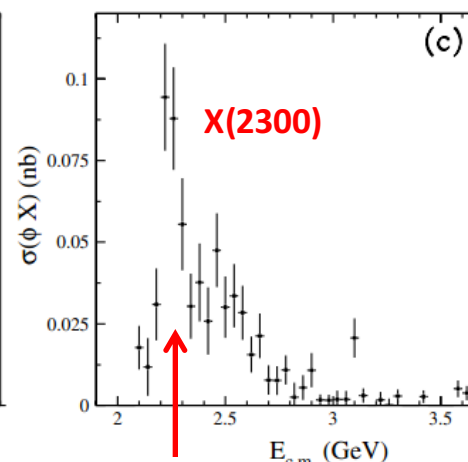
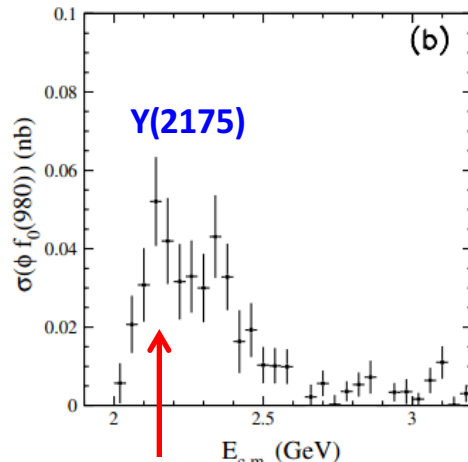
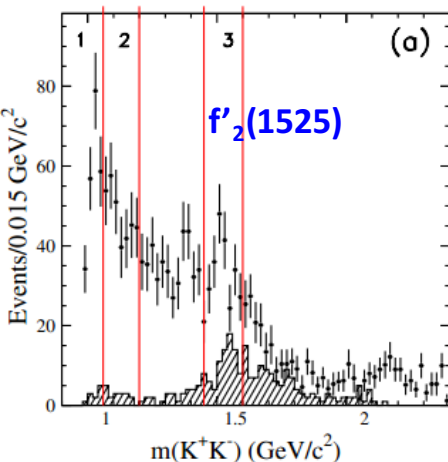
❖ Cross section line shape of $e^+e^- \rightarrow \gamma_{\text{ISR}} K^+K^-K^+K^-$.

- Possible narrow structure around 2.3 GeV.
- $e^+e^- \rightarrow \phi(1020)K^+K^-$ channel dominates the $K^+K^-K^+K^-$ final states.

❖ Search of $Y(?) \rightarrow \phi(1020)K^+K^-$.



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$Y(2175) \rightarrow \phi f_0(980)$

$X(2300) \rightarrow \phi K^+K^-$

$X(2700) \rightarrow \phi f'_2(1525)$

Signal extraction@3080MeV

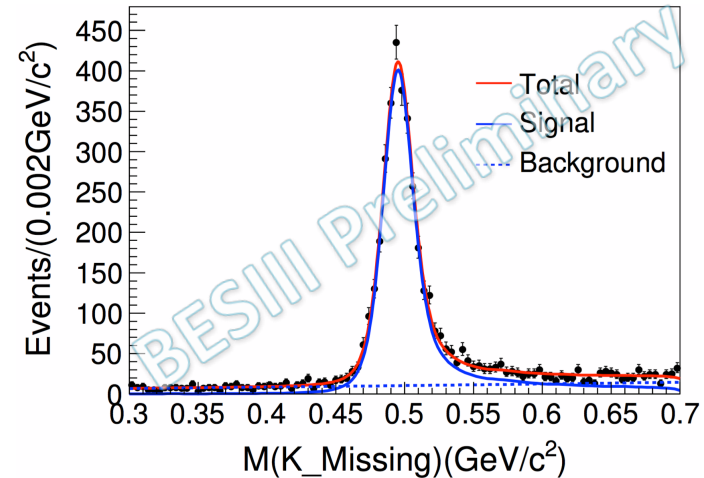
(1) K_Missing Fitting :

Signal: MCShape $\otimes$ Gaussian;

Background:

Chebyshev Polynomial;

$$N=3693.7 \pm 73.1$$



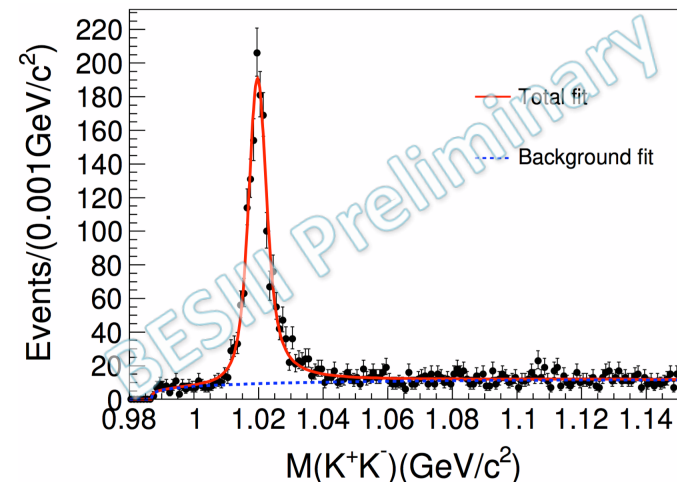
$$(1) \chi^2_{1c}(K^+K^-K^+K^-) < 20;$$

(2) $\phi(1020)$ Fitting :

Signal: P-wave BW $\otimes$ Gaussian;

Background: Argus;

$$N=1690.8 \pm 50.1$$



Summary

❖ With R-scan data sets [2.0, 3.08]GeV, we search for new decay mode of $Y(2175)$.

- ❑ Measurements of cross sections of $e^+e^- \rightarrow \phi K^+ K^-$ and $K^+K^-K^+K^-$, we only observe an enhancement near threshold in the line shape of cross section.

