

# Study of $\phi(2170)$ at BESIII

Friday, July 31, 2020 11:10 AM (15 minutes)

For  $e^+e^-$  collision between 2 and 3 GeV, excited states of  $\rho$ ,  $\omega$  and  $\phi$  could be produced directly, some of them are not fully studied yet, especially several resonances around 2GeV like  $\rho(2000)$ ,  $\rho(2150)$  and  $\phi(2170)$ . Theorists explain  $\phi(2170)$  as a traditional  $s\bar{s}$  state,  $s\bar{s}g$  hybrid, tetraquark state,  $\Lambda\bar{\Lambda}$  bound state, and  $\phi$  KK resonance state, and predict very different decay width with different nature of  $\phi(2170)$ . In review of experimental side, the number of decay modes of  $\phi(2170)$  are limited, and there is inconsistencies on mass and width of  $\phi(2170)$ . With energy scan data collected by BESIII detector between 2.0GeV and 3.08GeV, we performed PWA of  $e^+e^- \rightarrow K^+K^-\pi^0\pi^0$ , and extracted lineshape of  $K(892)K(892)\bar{K}$ ,  $KK1(1460)$ ,  $KK1(1270)$  and  $KK1(1400)$ , and compared BESIII results that of theory prediction (arXiv: 2001.04131). we report results on  $\phi(2170) \rightarrow \phi\eta'$  and  $\phi\eta$ , compare their ratio with that of hybrid prediction on  $\phi(2170)$ . We also present results on  $e^+e^- \rightarrow K^+K^-$  (Phys. Rev. D99, 032001 (2019)),  $\phi K^+K^-$  (Phys. Rev. D100, 032009(2019)),  $\omega\pi^0$  and  $\omega\eta$ . We also use lineshape of  $e^+e^- \rightarrow \eta'\pi^+\pi^-$  to study  $\rho(2000)$  and  $\rho(2150)$ .

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## Secondary track (number)

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