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Study of $\phi(2170)$ at BESIII

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In e^+e^- collisions between 2 and 3 GeV, excited states of ρ , ω and ϕ can be produced directly. Especially the resonances around 2GeV like $\rho(2000)$, $\rho(2150)$ and $\phi(2170)$ are not fully understood yet. Theorists describe the $\phi(2170)$ as a traditional $s\bar{s}$ state, an $s\bar{s}g$ hybrid, a tetraquark state, a $\Lambda\bar{\Lambda}$ bound state, or a ϕKK resonance. The predicted decay widths vary strongly depending on the assumed nature of $\phi(2170)$. With energy scan data collected by the BESIII collaboration between 2.0 GeV and 3.08 GeV, the properties of $\phi(2170)$ are studied systematically in PWAs of its expected decay modes, such as $e^+e^- \rightarrow K^+K^-\pi^0\pi^0$, $\phi\eta'$, $\phi\eta$, K^+K^- , and $\eta'\pi^+\pi^-$.

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