Searching for Lepton Flavor Violation Decays $J/\Psi \to e\mu, \mu\tau$ and $e\tau$ at BES

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Brief Introduction

In the SM of electroweak theory, the lepton flavor symmetries are conserved. In many extensions of the SM, lepton flavor symmetries speculated to be violated. Some theorists predicted LFV decay branching-ratio of vector bosons($\phi, J/\Psi, \Psi', \Upsilon, Z^0$) in recent years. Super-Kamiokande and Kamland, SNO experimental results indicate strongly $m_\nu \neq 0$, and mix with each others.

The sample of J/Ψ events collected at BESII is the largest one in the world, and it is interesting to search for LFVD with the J/Ψ sample. Using a sample of 5.8×10^7 J/Ψ events, the Beijing Spectrometer experiment has searched for the decays $J/\Psi \to e\mu, \mu\tau(\tau \to e\nu\nu)$ and $e\tau(\tau \to \mu\nu\nu)$. Four candidates for $J/\Psi \to e\mu$, zero candidate for $J/\Psi \to \mu\tau(\tau \to e\nu\nu)$ and one candidate for $J/\Psi \to e\tau(\tau \to \mu\nu\nu)$ are observed, which consistent with the estimated background. And upper limits on the branching ratios of $J/\Psi \to e\mu, \mu\tau$ and $e\tau$ of $1.1\times10^{-6}, 2.0\times10^{-6}$ and 8.3×10^{-6} at the 90%C.L. are obtained respectively. These are first results for the searches.