Study of $X(3872) \rightarrow J/\psi \pi \pi$ in $B \rightarrow X(3872)K^-$ and $B \rightarrow X(3872)K^0_S$

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We search for a charged partner of the $X(3872)$ in the decay $B^- \rightarrow X^- K^-$, $X^- \rightarrow J/\psi \pi^- \pi^0$, using 234 million $B\bar{B}$ events collected at the $\Upsilon(4S)$ resonance with the BaBar detector at the PEP-II $e^+e^-$ asymmetric-energy storage ring. The resulting product branching fraction upper limits are $BR(B^0 \rightarrow X^- K^+, X^- \rightarrow J/\psi \pi^- \pi^0) < 5.4 \times 10^{-6}$ and $BR(B^- \rightarrow X^- K^0_S, X^- \rightarrow J/\psi \pi^- \pi^0) < 22 \times 10^{-6}$ at the 90% confidence level. In addition, we update the previous BaBar result on $B^- \rightarrow X(3872)K^-$, $X(3872) \rightarrow J\psi \pi^+ \pi^-$ with increased statistics and extend the search to include $B^0 \rightarrow X(3872)K^0_S$ as well as $X(3872) \rightarrow J\psi \pi^0 \pi^0$.

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