Dalitz Plot Analysis of the Charmless Threebody Decay $B^{\pm} \rightarrow K^{\pm}K^{\pm}K^{\mp}$ Utilising Data Recorded by the *BaBar* Experiment

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Abstract

The results from a Dalitz plot analysis of the charmless threebody decay $B^{\pm} \to K^{\pm}K^{\pm}K^{\mp}$ are presented. The analysis is carried out using data recorded with the *BABAR* detector. The data sample has an integrated luminosity of $210.6\,\mathrm{fb}^{-1}$, corresponding to 231.8 million $B\overline{B}$ pairs.

Branching fractions and CP asymmetries are presented for significant contributions to the mode $B^{\pm} \to K^{\pm}K^{\pm}K^{\mp}$. Modes found to be not significant, have an upper limit placed on their branching fraction.

No significant CP asymmetries are observed. The measured branching fractions and upper limits are:

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\begin{aligned}
&\mathcal{B}(B^{\pm} \to K^{\pm}K^{\pm}K^{\mp} \text{ inclusive}) &=\ & (35.1 \pm 1.3 \pm 2.1) \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to K^{\pm}K^{\pm}K^{\mp} \text{ non-resonant}) &=\ & (18.6 \pm 3.4 \pm 1.8) \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to \phi(1020)K^{\pm}, \phi(1020) \to K^{+}K^{-}) &=\ & (4.3 \pm 0.6 \pm 0.3) \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to f_0(980)K^{\pm}, f_0(980) \to K^{+}K^{-}) &=\ & (8.7 \pm 3.1 \pm 1.4) \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to (KK)^{0}_{0}K^{\pm}, (KK)^{0}_{0} \to K^{+}K^{-}) &=\ & (3.3 \pm 1.1 \pm 0.7) \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to \chi_{c0}K^{\pm}, \chi_{c0} \to K^{+}K^{-}) &<\ & 2.9 \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to \phi(1680)K^{\pm}, \phi(1680) \to K^{+}K^{-}) &<\ & 1.5 \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to f_2(1270)K^{\pm}, f_2(1270) \to K^{+}K^{-}) &<\ & 1.1 \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to f_2'(1525)K^{\pm}, f_2'(1525) \to K^{+}K^{-}) &<\ & 2.4 \times 10^{-6}, \\
&\mathcal{B}(B^{\pm} \to f_0(1710)K^{\pm}, f_0(1710) \to K^{+}K^{-}) &<\ & 3.3 \times 10^{-6}.
\end{aligned}
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