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Global alignment methods of the inner silicon tracker (HFT) of the STAR experiment at RHIC

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We present an overview of two global alignment procedures developed for the Heavy Flavor Tracker[1] (HFT), the new silicon upgrade detector of STAR experiment at RHIC. Both methods are iterative minimization techniques and use as input the hit residual information from primary tracks reconstructed by the STAR TPC. One relies on a factorization of the alignment steps and uses histogramming techniques to improve the robustness of the minimization, while the other is based on a global χ^2 minimization technique developed for the CMS detector[2]. The methods'performance was extensively tested using simulations with mis-alignments. Here we present the basic elements of the methods, their estimated performance characteristics and also their application to data collected from a PIXEL prototype beam test in 2013.

[1]:HFT proposal: http://rnc.lbl.gov/˜wieman/hft_final_submission_version.pdf

[2]:The HIP algorithm for track based alignment and its application to the CMS detector, V. Karimaki et. al., CMS note 2006/018

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