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Simultaneous Global and Local Alignment of the Belle II Tracking Detectors

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The alignment of the Belle II tracking system composed of a pixel and strip vertex detectors and central drift chamber is described by approximately 60,000 parameters. These include internal local alignment: positions, orientations and surface deformations of silicon sensors and positions of drift chamber wires as well as global alignment: relative positions of the sub-detectors and larger structures.

In the next data reprocessing, scheduled since Spring 2021, we aim to determine all parameters in a simultaneous fit by Millepede II, where recent developments allow to achieve a direct solution of the full problem in about one hour and make it practically feasible for regular detector alignment.

The tracking detectors and the alignment technique are described and the alignment strategy is discussed in the context of studies on simulations and experience obtained from recorded data. Preliminary results and further refinements based on studies of real Belle II data are presented.

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