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A new process for calculating beam offsets during alignment

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Accurate alignment of beam components in particle accelerators is crucial to optimize machine performance and enhance precision measurement in the experiments. CERN is developing a new process for calculating beam position offsets directly in the field during the alignment stage.
This process benefits from recent developments within CERN's adjustment software, LGC (Logiciel Général de Compensation), which allows the use of geometrical data of the equipment, and roll angle measurements, directly into compensation calculations. This allows in-field calculation and adjustment of components at the beam position level, which becomes inaccessible once the component is installed. This streamlined sequence minimises beam point offsets and enhances overall alignment quality. Significant effort has been put into ensuring the process is flexible and user-friendly. This allows field teams to utilize it efficiently with limited time and calculation tools, without requiring extensive knowledge of the machine and its operational history. This paper presents an overview of the calculation process, emphasizing input data quality and provides a comparison with existing calculations to evaluate the potential benefits of this new method.

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