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## Optics Code MAD-X and Tracking code SixTrack at CERN - An Overview

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The MAD in its F77 incarnation of version 8 has been very successful in the 90's and is used around the world even today. The LHC design tool was supposed to be MAD9 written from scratch in C++. Since this failed, despite a major 5 years effort, the MAD-X project was started. In early 2000 Hans Grote and a team of module keepers had to construct a C & F77 hybrid code within 6 months to provide the desperately needed optics code for the LHC design phase. MAD-X allowed all design work for the LHC and has also become central to the commissioning and control phase of the LHC. The code was complemented by the PTC code written by E. Forest from KEK to allow for a more modern description of accelerator elements and to make use of long established NormalForm techniques.

Presently, there is an attempt to rewrite MAD from scratch to overcome the inherent limitations of MAD-X. In parallel there has been a decade long strive to speed optimize the single particle tracking code SixTrack. It gets its input from MAD and was used to evaluate the long-term stability limited due to magnet imperfections and the beam-beam interactions. SixTrack is meant for massive tracking studies and has been adapted over the years to the latest computing facilities like the CRAY supercomputers, farms of PCs, world-wide distributed computing on home computers and more recently the option of GPU computing is envisaged.

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