MAD-X - AN ACCELERATOR DESIGN CODE

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Abstract

The new modular design of MAD-X program gives large flexibility with respect to previous version of the program. The core of MAD-X is written in C with interfaces to many independent packages in C or Fortran. All consistent MAD8 modules have been retained in MAD-X. For each of these modules a responsible person is assigned who performs bug fixes, maintenance and further developments. This set-up allows for easy implementation of independent code or algorithms as new MAD-X modules. The MAD-X input language has been extended with considerably more flexibility than MAD8. Portability of the code has been a priority and MAD-X is available on several platforms. We provide the complete source code, examples and documentation on the web. From a modern accelerator code one expects more advanced facilities than MAD-X can offer. To this end, MAD-X is linked to the independent Polymorphic Tracking Code (PTC). The main new features are: Maps and Normal Form techniques, symplectic treatment of thick accelerator elements and proper placing of the elements on the accelerator floor. Typical MAD-X runs will be performed that demonstrate the flexibility of the MAD-X input language. Various applications of the combined use of MAD-X and PTC will be given, with emphasis on using Normal Form to describe the non-linearities in accelerator models. Existing complex and also "fantasy" accelerator structures will be depicted together with particle trajectories simulated through them. There will also be examples of structures with complicated 3D positioning of magnets on the accelerator floor.

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