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## Status of MAD-X V5.09

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MAD-X is a popular beam optics code used to design, model and operate a large number of synchrotrons and linacs. In this paper, we present the features added in the most recent versions and improvements we intend to make in future releases. Physics models have been added and improved to support the needs of the Future Circular Collider (FCC) and the Electron Ion Collider (EIC), regarding machine-detector interface, complex beamline layouts, and synchrotron radiation. More precise physics models have been implemented for some elements, and a complete set of exact coordinate frame transformations are now available. The tracking module has been extended to support frozen space-charge models. To improve interoperability with scientific ecosystems, MAD-X relies on the cpmad Python interface which offers a fine-grained control of MAD-X simulations, exceeding the capabilities of the internal MAD-X language.

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### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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