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# Xsuite tutorial

Xsuite is a modular simulation package bringing to a single flexible and modern framework capabilities of different tools developed at CERN in the past decades, notably MAD-X, Sixtrack, Sixtracklib, COMBI and PyHEADTAIL. The suite consists of a set of Python modules (Xobjects, Xpart, Xtrack, Xcoll, Xfields, Xdeps) that can be flexibly combined together and with other accelerator- specific and general-purpose python tools to study complex simulation scenarios. Different computing platforms are supported, including conventional CPUs, as well as GPUs from different vendors. The code allows for symplectic modeling of the particle dynamics, combined with the effect of synchrotron radiation, impedances, feedbacks, space charge, electron cloud, beam-beam, beamstrahlung, and electron lenses. For collimation studies, beam-matter interaction is simulated using the K2 scattering model or interfacing Xsuite with the BDSIM/Geant4 library. Methods are made available to compute and optimize the accelerator lattice functions, chromatic properties, equilibrium beam sizes. By now the tool has reached a mature stage of development and is used for simulations studies by a large and diverse user community.

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