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High level software for beam phase space and trajectory characterization

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Operation of modern particle accelerators require high brightness beam and sensitive diagnostic system in order to monitor and characterize the beam during the acceleration and transport.

A turn-key high level software has been designed to fully characterise the 6D beam phase space and the trajectory in order to help operator during commissioning with an easily scalable suite for any high brightness LINAC. In this work will be presented BOLINA (Beam Orbit for LINear Accelerators) the high level software designed for the ELI-NP Gamma Beam System (GBS) providing tuneable gamma rays with narrow bandwidth (0.3%) and a high spectral density (104 photons/sec/eV) by the Compton backscattering effect. BOLINA architecture is designed machine independent and usable for any type of LINAC and is consistent with any type of control system, thanks to the interpreted and object oriented Python code.

Currently BOLINA suite interfaced with EPICS control system, manages automatically accelerator devices to allow electron beam diagnostic measurements. The diagnostic tool is part of BOLINA (Beam Orbit for LINAC Accelerators) suite that provides the simultaneous optimization of trajectory and dispersion granting the beam trajectory which reduces the emittance dilution through the accelerator to reach accelerator's nominal parameters needed to maximize the beam luminosity.

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