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Quasi-isochronous conditions and high order terms of momentum compaction factor at the compact Storage Ring

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The compact storage ring project for accelerator research and technology (cSTART) is realized at the Institute for Beam Physics and Technology of the Karlsruhe Institute of Technology (KIT). Flexible lattice of a ring benefits variety of operation modes. Different physical experiments including direct injection and circulation of Laser Plasma Accelerator (LPA) electrons are planned at cSTART. Deep variation of momentum compaction factor with simultaneous control of high order terms of alpha would demonstrate the capture and storage of ultra-short bunches of electrons in a circular accelerator. Computer studies of linear and non-linear beam dynamics were performed with an objective to estimate arrangement and performance of dedicated three pole chican magnets to provide quasi-isochronous conditions for electrons. Additional families of so called "longitudinal"sextupoles and octupoles were added in a ring to control slope and curvature of momentum compaction factor as function of energy offset of particles in a bunch.

Summary

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