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Simulation Studies of the Particle Dynamic in Beam: Internal Target and Beam-Beam Interactions in the Figure-8 Storage Ring(F8SR)

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The Figure-8 storage ring (F8SR) concept for fusion reaction research in context of astrophysics is under development at Frankfurt University. In contrast to traditional storage rings, a guiding longitudinal magnetic field is used for confinement of very low energy charged particle beams continuously with high transverse momentum acceptance. Due to the strong magnetic field level ($B=6$ T), low energy proton and ion beams ($W < 1$ MeV) of several amperes can be confined. Many characteristic and unique features (e.g. injection system, collider mode) and key components were developed in the past. The current developments are concentrated on the design of a beam-target area and detectors. Particle-in-cell (PIC) simulation of high current beam propagation through a target area and interaction with an internal gas target will be presented and discussed. Possible space charge compensation through confined electrons will be assessed. Investigation of the large target area for colliding beam mode will be presented and discussed as well.

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Footnotes

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Yes

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