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Studies on beam injection system for Wuhan Advanced Light Source storage ring

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Wuhan Advanced Light Source (WALS) is the low-energy 4th generation advanced light source, which is proposed by Wuhan, China. WALS includes a 1.5 GeV full-energy LINAC injector, a 180 m circumference, 1.5 GeV low-emittance storage ring, and a series of start-of-the-art beam lines. The standard 7BA magnetic focusing structure is adopted for the storage ring to lower the beam natural emittance and the lattice has been well- designed and optimized by multiple-objective genetic algorithm to maximize the dynamic aperture and energy acceptance. The dynamic aperture of the storage ring at injection can reach up to 8 mm in the horizontal plane, which makes the off-axis beam injection method possible. An off-axis beam injection scheme based on the pulsed nonlinear magnet is to be employed for the storage ring. Detailed studies about the beam injection scheme, including the beam optical design, nonlinear magnet design and optimization, have been performed and multi-particle simulations have also been carried out to study the beam injection procedure, which will be presented in this paper.

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