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Theory, Simulation, and Design of a High-Brightness Heavy-Ion Beam System[1] RONAK BHATT, TOM BEMIS, CHIPING CHEN, JING ZHOU, Massachsetts Institute of Technology — A method is presented for the design of a high-brightness heavy-ion beam system. The recent elliptical beam diode theory of [1] is applied to form a laminar elliptical heavy-ion beam. A technique is presented to ideally match this beam from the diode into a periodic magnetic quadrupole focusing channel. A realization of the magnetic focusing system is implemented using Opera3D. The beam system design is verified with 3D OMNITRAK simulations. Applications of such beams in high-energy density physics research are discussed. [1] R. Bhatt and C. Chen, Phys. Rev. ST Accel. Beams 8, 014201 (2005).

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