Self-Consistent Simulation of the CSR Effect in Lattice Design*, C.L. BOHN, J.J. BISOGNANO, <u>R. LI</u>, TJNAF - When a short bunch with high charge is transported through a magnetic bending system, the curvature induced bunch self-interaction, by way of coherent synchrotron radiation (CSR) and space charge, may cause emittance degradation. This phenomenon has raised considerable concern in the design of free-electron-laser (FEL) drivers containing bunch-compressing chicanes and recirculation arcs. Circumventing this deleterious effect demands a thorough understanding of the physics involved as well as computational tools for the prediction of the CSR effect in lattice designs. In this paper, we present a self-consistent simulation for the CSR effect in beam optics. The dynamics of a bunch simulated by macroparticles is influenced by the CSR forces, which in turn are generated by the bunch in accordance to causality. The simulation is bench-marked with analytical results for a rigid bunch. The algorithm applied in the simulation will be presented along with the simulation results obtained for bending systems in the Jefferson Lab FEL lattice.