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The First Particle-Based Proof of Principle Numerical Simulation of Electron Cooling SUMANA ABEYRATNE, BELA ERDELYI, Northern Illinois University — Future particle accelerators require high luminosities in order to make precise measurements during collisions. The proposed electron ion collider at JLAB (JLEIC) has targeted an ultra-high luminosity of 10^{34} $cm^{-2}s^{-1}$. Reducing emittance growth is one key requirement to achieving high luminosity. Emittance growth is reduced by a process known as electron cooling, where a 'cold' electron beam is co-propagated with a 'hot' proton or ion beam in the cooling section of the accelerator. In order to estimate the cooling time accurately, the cooling force among particles needs to be precisely calculated. To this end, we have developed a high performance computer code which allows to simulate electron cooling. Our code is the first particle-based simulation of electron cooling. In this work, we present the first results obtained that establish electron cooling of heavy ions.

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