Abstract Submitted
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Particle-In-Cell simulations of high pressure plasmas using graphics processing units[1] MARKUS GEBHARDT, FRANK ATTELN, RALF PETER BRINKMANN, THOMAS MUSSENBROCK, PHILIPP MERTMANN, PETER AWAKOWICZ, Ruhr University Bochum — Particle-In-Cell (PIC) simulations are widely used to understand the fundamental phenomena in low-temperature plasmas. Particularly plasmas at very low gas pressures are studied using PIC methods. The inherent drawback of these methods is that they are very time consuming – certain stability conditions has to be satisfied. This holds even more for the PIC simulation of high pressure plasmas due to the very high collision rates. The simulations take up to very much time to run on standard computers and require the help of computer clusters or super computers. Recent advances in the field of graphics processing units (GPUs) provides every personal computer with a highly parallel multi processor architecture for very little money. This architecture is freely programmable and can be used to implement a wide class of problems. In this paper we present the concepts of a fully parallel PIC simulation of high pressure plasmas using the benefits of GPU programming.

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