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Particle-in-cell simulation using parallel techniques N. HANZLIKOVA, H. LEGGATE, M.M. TURNER, Dublin City University, Ireland — Particle-in-cell simulation is an accurate but computationally expensive approach to modelling low-temperature plasma. Consequently, implementations of this method should preferably make efficient use of computer resources. In modern hardware, such resources typically include a high degree of parallelism, using facilities such as vectorisation and multi-threading. Capabilities of this kind appear in both general purpose processors and in more specialised hardware such as graphical processing units. In principle, very large improvements in performance can be achieved by exploiting such hardware. This paper discusses particle-in-cell implementation using features of this kind. We will show that accelerations in excess of an order of magnitude are quite easily achieved, and that considerably greater performance is likely to be achieved with specialized hardware.

Miles Turner
Dublin City University

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