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Selected methods in N-body simulations

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This paper discusses the implementation of the particle-mesh (PM) and particle-particle particle-mesh (P3M) methods in the context of a spiral galaxy simulation. Simulations performed using both methods correctly predict the formation of characteristic spiral arms and demonstrate expected physical behavior, satisfying Newton's second law and conserving energy and angular momentum. The PM code was written for both the CPU and GPU architectures, with the GPU version achieving approximately sevenfold speedup compared to the multithreaded CPU implementation.

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