ENERGY SPECTRUM,ACCELERATION TIME IN RELATIVISTIC SHOCK ACCELERATION

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Using the distributions given in an accompanying paper (Protheroe 2001) enables the downstream part of relativistic shock acceleration to be simulated quickly and efficiently by sampling (a) θ_2 from $p(\theta_2,\theta_1)$, (b) t_d from $p(t_d,\theta_2,\theta_1)$ for a particle crossing from upstream to downstream at angle θ_1. The program is made more efficient by the use of weights which depend on ${\rm Prob.(return}, \theta_1)$. Simple hard sphere scattering should be a reasonable approximation in the downstream region where the magnetic field is expected to be turbulent. Particle propagation in the upstream region is efficiently simulated by using the Monte Carlo method to directly follow each particle as less time is spent in this region because of the strong convection towards the shock. Also, particle trajectories in the upstream region depend more on the assumptions of the upstream magnetic field configuration, implying that parametrizing angular and time distributions is not justified in this case. Preliminary results on the accelerated spectra, angular and time distributions are presented for simple plane shocks.