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PIC code simulations of solar flare processes

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The results of the 2.5D and 3D particle-in-cell simulations of several processes in solar flares are presented. It is shown how the plasmoids during the magnetic reconnection are formed, how the electrons are accelerated and the electromagnetic waves are produced. The relevance of these processes to the drifting pulsating structures observed on radio waves is mentioned. Conditions for the separation of particles of different electric charges in the reconnection are presented. Furthermore, the processes of the electric current fragmentation and return current formation are described in 3D PIC electromagnetic models. Finally, the generation of whistler waves at flare shocks and the band splitting of type II solar radio bursts are shown.