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The spectrum of energetic electrons in collisionless magnetic reconnection

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Magnetic reconnection is a fundamental process during which the magnetic field lines are broken and reconnect again. It provides an effective mechanism responsible for converting rapidly magnetic energy to kinetic energy of plasma. Recent observations in both solar flares and magnetotail indicate that a substantial amount of the magnetic energy is released in the form of energetic electrons, and energetic electrons are one of the important signatures in magnetic reconnection. Two-dimensional Particle-in-cell simulations are performed in our research to study the effects of the guild field and the multi X-lines reconnection on the spectrum of energetic electrons in collisionless magnetic reconnection. Further more, a possible explanation for the formation of different spectrum in different regions and different time is tried to be offered, and comparisons with the observed spectrum of energetic electrons during solar flares are also made.