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Characteristics of accelerated particles in the solar atmosphere

Solar flares evolve on multiple scales and cannot be explained or simulated without considering the effects of accelerated particles. The particles reach non-thermal velocities due to the release of magnetic energy through magnetic reconnection, and they are observed through hard X-ray emission and ultraviolet radiation produced in flare ribbons. However, the key processes behind the acceleration is heavily debated and the observed signatures point towards an energy distribution which varies significantly from flare to flare. We are embedding trace particles in realistic solar reconnection environments to study the characteristics of particle acceleration and investigate how large scale conditions affect the energy distribution. MHD simulations provide the solar environments and the trace particle motion is simplified by using the gyrocentre approximation.

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