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Numerical simulation of particle acceleration in the solar corona above active regions

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Recent solar observations have provided important information about particle acceleration above active regions in the course of solar flares. Although many models have been proposed the many questions still remain open. We use different relativistic test particle approaches to study the acceleration mechanisms by magnetic reconnection. We choose to calculate the full particle trajectories by two different codes as well as an approach calculating the motion of the guiding center . The magnetic and electric fields are obtained from MHD simulations of the active region dynamics using subgrid information to calculate the accelerating electric fields. Our MHD simulations are based on the observations. The initial magnetic field is extrapolated from magnetogram of active region. The particles are most efficiently accelerated by the parallel component of electric field. We investigate the particle acceleration in dependence on various subgrid models dependent on the current carrier velocity.. In particular we studied the dependence of the acceleration time and the energy gain of particles as well as their energy distribution needed to calculate the Hard X-ray spectrum to be compared with the observations of the RHESSI solar X-ray telescope.