Abstract Submitted
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Surfatron acceleration in coronal mass ejections LUIS GARGATE, GoLP/CFP, Instituto Superior Tecnico, Portugal, ROBERT BINGHAM, SSTD, Rutherford Appleton Laboratory, UK, RICARDO FONSECA, DCTI, Instituto Superior de Ciencias do Trabalho e da Empresa, Portugal, LUIS SILVA, GoLP/CFP, Instituto Superior Tecnico, Portugal — We use a massively parallel 3D hybrid particle code, dHybrid, to simulate the corona environment and the acceleration mechanisms of Solar Energetic Particles. The hybrid model uses massless fluid electrons and kinetic ions. The parallel implementation of this model allows the study of large regions of space (e.g. hundreds of ion gyro radius) over extended periods of time (e.g. tens of ion gyro periods), ideal for space plasma studies. In our simulations a CME structure propagates at speeds of up to 1000 km/s interacting with the slower solar wind. The interactions cause the formation of a large scale quasi-parallel shock structure due to the flowing CME. The acceleration mechanisms of high energy particles are studied in this scenario. In the early acceleration phase, our results show that particles crossing the shock front accelerate perpendicularly to the shock front while maintaining their parallel velocity, supporting a surfatron-like acceleration model. The importance of this acceleration model as a means of providing a seed particle population for further acceleration is studied.

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