



Gamma Rays from Martian Dust Storms

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Martian dust storms are suggested to be able to generate electric fields close to the breakdown values for Mars' atmosphere, i.e. 25 kV/m [Farrel et al. 2006]. Such electric fields could initiate large electrostatic discharges on Mars [Ruf et al. 2009]. Additionally, similar to terrestrial thunderstorms, they might also be able to produce bright bursts of X-rays and gamma rays. On Earth, thunderstorm electric fields could produce avalanche of energetic electrons from single seed electron, through Møller scattering with air atoms and molecules. The process is called Relativistic Runaway Electron Avalanche (RREA), and can then generate large flux of X-rays and gamma rays through bremsstrahlung scattering.

In this presentation, we have used detailed Monte Carlo simulations to study the possibility of producing large flux of energetic photon from a RREA-like mechanism inside Martian dust storms.