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Proton acceleration in three-dimensional non-null magnetic reconnection MAHBOUB HOSSEINPOUR, Plasma Physics Department, Faculty of Physics, University of Tabriz, Tabriz, Iran — In a 3D non-null magnetic reconnection the process of magnetic reconnection takes place in the absence of a null point where magnetic field vanishes. By randomly injecting a population of 10,000 protons, the trajectory and energy distribution of accelerated protons are investigated in the presence of magnetic and electric fields of a particular model of non-null magnetic reconnection. The results show that protons are accelerated along the magnetic field lines away from the non-null point only at azimuthal angles where the magnitude of electric field is strongest and therefore particles obtain kinetic energies on the order of thousands of MeV and even higher. Moreover, the energy distribution of the population depends strongly on the amplitude of the electric and magnetic fields. Comparison shows that a non-null magnetic reconnection is more efficient in accelerating protons to very high GeV energies than a null-point reconnection.

Mahboub Hosseinpour Plasma Physics Department, Faculty of Physics, University of Tabriz, Tabriz, Iran

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