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Kinetic simulations of magnetic reconnection in three-dimensional null-points.

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We report kinetic particle-in-cell simulations of an essentially three-dimensional magnetized plasma configuration. Initially the evolution is governed by large-scale fluid modes excited by the pressure imbalance. At this phase current channels (pinches) are created along the sequences of spiral null-points. After ten ion gyroperiods the relaxation is over, and about half of magnetic energy is converted to ion currents, particle heating, and generation of suprathermal particles. At the next phase the evolution is dominated by volumetric magnetic reconnection, mainly associated with spiral null-points (pinches); non-spiral nulls don't play important role in the energy release. Such reconection is a possible mechanism of magnetic energy dissipation in turbulent space plasmas where currents and twisted field lines are ubiquitous.