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Charged particle acceleration in the CS of the Mercury magnetosphere: comparison of different mechanisms

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The mechanisms of particle acceleration in the CS of the Mercury magnetosphere were investigated. The numerical model is developed that allows evaluating the acceleration of ions H^+ , He^+ , O^+ in two possible mechanisms of particle acceleration: (1) by multiple dipolarizations during substorm activity passage of fronts; (2) by the turbulent electromagnetic field in the magnetosphere. Our simulation show that all kinds of charged plasma particles can be efficiently accelerated during multiple dipolarizations processes of the type (2) to maximum energies about 100-200keV. The gain of energies of ions under the (2) process of magnetospheric perturbations is about 10% higher than in the second case. The shapes of obtained in the model energy spectra were shown to be in agreement with experimental spectra. We conclude that the role of these mechanisms is more important near Mercury in comparison with plasma processes in the Earth's magnetosphere.