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## Plasma Confinement in the Trimix-3M Multipole Galatea Trap

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Quasi-stationary plasma confinement with a high  $\beta$  value was implemented in the Trimix-3M multipole magnetic trap. In the trap, magnetic surfaces of complex cross-section delimit a closed toroidal region with zero magnetic field at its center. The lifetime of the plasma in the trap is  $\sim 1$  ms and the average value of  $\beta$  is  $\sim 0.35$ . The Rogowski loop is used to measure the value of the toroidal current arising after the injection of a plasmoid through the magnetic crust of the Trimix-3M magnetic multipole trap. This current is due to plasma diamagnetism. A relation is established between the value of the diamagnetic current and the maximal plasma pressure realized on the separatrix of the magnetic field of the trap. It is thus shown that magnetic measurements in the multipole trap, for a known concentration value, allow us to determine the plasma temperature in the trap and the energy confinement time. Injection of a plasmoid is implemented through the magnetic crust of the trap. Both theory and experiment have shown that the depth of penetration of the plasmoid into a transverse magnetic field is proportional to the plasmoid energy and is inversely proportional to the magnetic pressure and the cross-section area of the plasmoid. This fact can be used to optimize the process of trapping a plasmoid.

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