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DIAMAGNETIC MEASUREMENTS AT THE CAT DEVICE *)

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The CAT facility (Compact Axisymmetric Toroid) was built at BINP SB RAS. The facility is an axially symmetric magnetic mirror trap in which plasma with thermonuclear parameters is being heated using powerful neutral injection beams. Heating the plasma with high current density beams promises high values of the relative pressure β of the formed plasmoid [1]. The results obtained at the facility will serve as an experimental basis for designing the GDMT linear confinement system [2]. The research program at the CAT facility [3] is focused on studying methods for stabilizing hot plasma with high relative pressure $\beta \approx 1$, demonstrating diamagnetic confinement and the reversal of the leading magnetic field. The key points for achieving the aforementioned goals are measurement of the field reversal parameter $\Delta B/B$ and tracking the development of instabilities.

We show a method of measuring displaced magnetic field flux using two pairs of diamagnetic loops, different in radius and their position along the axis of the vacuum chamber, which allows us to achieve greater accuracy and to separate the contribution to total displaced flux from the target plasma and from hot ions. Radial magnetic field fluctuations are registered for studying developing instabilities, for which an assembly of twelve Mirnov coils is used, enabling measurements of non-axisymmetric fluctuations with azimuthal mode number $|m| \leq 5$ and with frequencies up to 2 MHz.

References

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