Diffusion of particles from tokamak by stochastization of magnetic field lines

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Abstract: The thesis summarizes the current state of research of thermonuclear fusion with magnetic confinement and decribes the possible role of stochastization of magnetic field lines and magnetic perturbations in solving some of the problems that are encountered on the road to the exploitation of fusion. It presents a theoretical introduction to deterministic chaos and explains the connection of this theory to magnetic perturbations in tokamak. The results are presented mainly in the form of publications in journals and conference proceedings. Among them are: the comparison of chaotic diffusion of particles and field lines, where significant differences were found; the application of chaotic diffusion of particles to the problem of runaway electrons originating in disruptions, where our simulations contributed to explaining the experimental results from the JET tokamak; the calculation of spectra of perturbations for the COMPASS tokamak, done as a preparation for the upcoming experiments; and modelling of screening of perturbations by plasma, where the observations of divertor footprints show as a promising method to detect the screening.