Compass tokamak ($R = 0.56\,\mathrm{m}$, $a = (0.23 \times 0.38)\,\mathrm{m}$, $I_p = 200 - 400\,\mathrm{kA}$, $B_T = 1.2 - 2.1\,\mathrm{T}$ and pulse length up to 1 s) is the smallest device with ITER-relevant plasma geometry with scale 1:10 to the ITER size.
A tokamak plasma confinement is strongly limited by an occurrence of magnetohydrodynamic (MHD) instabilities occurring during the discharge. In the thesis, theoretical considerations and a typical behaviour of the tokamak plasma MHD instabilites are summarized based on the literature overview. This discussion is complemented with an overview of the Compass diagnostics and different data analysis techniques. Finally, the examples of the Compass plasma behaviour influenced by sawtooth instability and tearing modes are shown and discussed.