

Thorough study of plasma behaviour in magnetically confined fusion devices is of great importance in recent research. Diagnostics capable to reliably provide important parameters of the hot plasma are key tool in the effort to control fusion energy on Earth. Thomson Scattering diagnostic has a credit of being a complex design diagnostic with reliable measurement of electron temperature and density profiles. The main subjects of this thesis are design of the Thomson Scattering system for the COMPASS tokamak, analysis of output data errors and exploitation of the data to study plasma behaviour. Besides this work, the author has been involved in the design of Thomson Scattering systems for the ITER tokamak and this design is presented here as well.