Runaway electron synchrotron spectra in FTU

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Understanding the main mechanisms that dominate the behaviour of high-energy runaway electrons (RE) is an important issue for the safe operation of tokamaks, particularly during disruptions. The synchrotron radiation emitted by runaways provides information about the energy and pitch angle of in-flight RE in different stages of the discharge. The recently developed Runaway Electron Imaging and Spectroscopy (REIS) system [1] was designed for the detection of runaway electron synchrotron spectra during plasma discharges in MST (Medium Size Tokamaks) devices and has been tested in the FTU tokamak. In this paper, we show synchrotron radiation spectra for typical FTU discharges. The measured synchrotron emission spectra are compared with calculated spectra, obtained by means of the numerical tool PySYRUP (Python translation of SYRUP [2]), for two cases: a) assuming monoenergetic RE beams with an energy equal to the maximum electron energy and b) using actual calculated runaway distribution functions by means of a test particle model of the runaway dynamics [3]. The consequences for the estimates of the runaway parameters by this methodology for the REIS system will be discussed.