Internship / Bachelor thesis
Course of Studies: Mechatronics/ Control Engineering or related

Topic: Fault Detection for the RF stations of the European XFEL

Task: The European XFEL is one of the largest linear accelerators in the world and will will start operation 2017. Through a 3.4 km tunnel, this accelerator extends form the DESY campus in Bahrenfeld all the way to Schenefeld. The electrons are accelerated by electromagnetic fields, which are operated within so-called RF stations. Each RF station has a sensor system with which the state of the machine (normal behavior / faulty behavior) should be diagnosed. Many of the errors to be expected can be detected by means of a threshold value overshoot. In doing so, care must be taken in which mode the machine is operated at the time of detection. In order to facilitate the operation of the machine, the cause of the error should be determined automatically. It must also be ensured that the faults are detected reliably and independent of the mode it is operated in.

The work is divided into the following tasks:

- Familiarization with the tasks and properties of an RF station
- Construction of an overview of the parameters and signal dependencies
- Analysis of dependencies of the parameters on different operating modes
- Validation using real-time measurements from an RF station

Start: Between the 1st of April and the 1st of May 2017
Requirements: Use of MATLAB, basic control engineering principles

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