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First Results of the SwissFEL Injector Test Facility LLRF System

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The first stage of the SwissFEL injector test facility is presently under commissioning at the Paul Scherrer Institut (PSI) in Switzerland. The injector is part of the SwissFEL project, a facility to deliver coherent, ultra-bright, and ultrafast XFEL photon beams down to the 0.1 nm wavelength ranges. The commissioning in this first phase was focused on the operation of a 2.5 cell normal conducting RF gun and two S-band travelling wave structures. In a second stage, the injector will be completed by two more S-band and one X-band (4th harmonic) travelling wave structures to boost the energy up to 250 MeV and linearize the longitudinal phase space before entering a magnetic bunch compressor. The most challenging task for the LLRF system is to maintain the tough RF tolerances in the order of 0.03 deg (rms) in S-band phase and 0.04 deg (rms) in X-band phase. A digital LLRF system has been designed and implemented with emphasis on low drift and high resolution performance in order to gain experience for the future SwissFEL LLRF system. This presentation will address the current status of the LLRF systems, present operational experiences and discuss further commissioning plans.

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