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Superconducting cavities cryo-module control challenges and LLRF system adaptation in case of long pulse operation mode.

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Superconducting niobium resonators are used nowadays in various high energy physics facilities as a particles accelerating structures.
Projects which consist of systems that execute single cavity field regulation are operated in continuous (CW) or pulse RF mode. In case of some free electron lasers based on the TESLA technology cavities (like Free electron Laser in Hamburg - FLASH or European X-ray Free Electron Laser - X-FEL) control systems for accelerating field parameters have been designed to regulate common supply power for multiple cavities.
Originally this experiments have been designed to operate in short (around 1,5 ms) RF pulses. Further technology developments give a possibility to extend this facilities operation to CW mode or long pulse mode. This effectively will allow to increase desired beam acceleration time slot and as an effect will increase overall machine availability for high energy physics experiments.
The paper presents our approach in adaptation of low level radio frequency (LLRF) control system from short pulse to long pulse (up to
500ms) operation. This activities have been performed in DESY where Cryo-module test bench (CMTB) infrastructure have been used. In scope of this paper the difference between superconducting cavities behavior in short pulse and semi-CW is discussed. Additional effort in development of high level automation or frequency control and LLRF are also presented.

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