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Digital LLRF system: concepts and requirements for proton therapy based on a linear accelerator

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Modern particle therapy requires systems which enable precise control over delivered dose depth. That translates into the ability to program the accelerator to quickly modulate the beam energy in order to deposit the treatment dose into predefined tissue regions. In particle therapy applications linear accelerators have advantages in terms of compactness and beam modulation ability. However to control the particle acceleration process from the beginning it's crucial to precisely stabilize the RF field inside the cavities through Low Level Radio Frequency feedback system. This talk introduces the concepts and the specific requirements of a LLRF system for a proton therapy LINAC. As an example the Libera LLRF implementation for the AVO-ADAM LIGHT linear accelerator will be presented.

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