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# Beam Loading Simulations in LINACs with RF-Track

*Tuesday, 17 October 2023 17:00 (2 hours)*

Linear Accelerators (LINACs) technology is evolving towards compactness and high intensity. As a consequence, these devices are becoming suitable for several industrial and medical applications, such as the upgrade of light sources to the so-called 4-th generation or the design of high-dose rate radio-therapy facilities. In such scenarios, intensity-dependent collective effects can arise and compromise the LINAC performance. This work focuses on the Beam Loading (BL) effect, which induces a reduction of the available accelerating gradient of the structure as a consequence of the interaction of the beam with the cavity. A power-diffusive model for the BL effect has been derived and implemented into the tracking code RF-Track. With this, transient scenarios in both standing-wave and travelling-wave LINACs have been studied. Good agreement has been found with experimental measurements carried out in the CLEAR facility at CERN.

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