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Beam Loading Effect in the tracking code RF-Track

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The beam loading (BL) effect results in the reduction of the gradient due to the interaction of the beam with the accelerating cavity. This phenomenon leads to energy losses for long trains of particles. Such an energy degradation is non-negligible in compact and high-intensity linear accelerators, whose popularity is increasing due to their industrial and medical potential. To account for this effect, a self-consistent BL module has been developed in the tracking code RF-Track. With this, BL effects in the CLEAR facility at CERN have been studied, where transient BL is present in both travelling- and standing- wave structures.

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