

A New Method of RF Power Generation for Two-Beam Linear Colliders,

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- During the past several years the CLIC study for a 30 GHz linear collider has developed methods for generating and manipulating the drive beams which can be used in a Two-Beam accelerator to power the main linac. In particular, in the multi-beam scheme, the drive beam is a sequence of trains of electron bunches separated in time so that the drive bunches arrive at each section of the linac at the same time as the high-energy beam. To create the high bunch repetition frequency within each group, RF deflectors are used together with an electron storage ring, to overlap different time segments of the beam to achieve both energy compression as well as an increase in the bunch repetition frequency. Thus, the required input drive beam is an essentially continuous beam with a pulse length equal to twice the length of the linac. In this paper we show that it is possible to create such a drive beam with a low frequency (625 MHz) conventional pulsed linac that is heavily loaded and extremely efficient. This type of 'two beam' RF system should be very reliable and quite inexpensive. The method also works for main linacs that use a different frequency RF system, and it is easily upgradable without major modifications to cover colliding beam energies from 0.5 TeV to 5.0 TeV using various acceleration gradients, RF frequencies and linac lengths.

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