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Stripline kicker design for FCC-ee booster injection and damping ring

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The FCC-ee booster injection kicker, will be injecting 4 particles bunches per single kick. The bunch separation in the booster ring is 25 ns and therefore requiring a faster kicker rise and fall time to not perturb injected or already circulating bunches. The wakefield impedance of the stripline is also important to not perturb the stored beam as well as it is necessary to ensure a good integrated fields and field homogeneity for kicking the bunches. The major challenge is to provide a precise impedance matching along the entire path of the electric pulse from the generator to the stripline termination. Transmission line cables, connectors and feedthroughs may already distort the pulse. 3D model of the stripline magnet including the high voltage connectors and simulation model of cables and generator was designed. It is shown that the results of the stripline magnet simulations meets the requirements, but the design of the entire system will need to be supplemented by research into active compensation for cable pulse distortion. The results are discussed in terms of validity due to assumed component parameters and ideas for benchmarking on a laboratory prototype are outlined.

Footnotes

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Europe

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