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Investigation on Microstrip based Pickup Monitor for Ultra Low charge Beam at 100 GHz

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The microstrip based pickup monitor (MPM) suited for arrival time detection is carefully investigated and the voltage signal at the feedthrough exit has been studied to obtain the optimized symmetrical signal amplitude and reduced wakefields prior to and subsequent to the bunch. Due to the superior potential behavior of the microstrip line with ultra-low charge signals (1pC) at 100 GHz bandwidth, waveguide to microstrip transition concept could be used as a novel way of approach which can give more accuracy for future generation experiments at EuXFEL, ARES and also at FLASH. MPM design has two units which are all-metal waveguide rods where the signals are initially captured and transferred to the microstrip combiner. The microstrip combiner unit has been properly matched with 50-ohm impedance and transition techniques such as wedge shaped, stepped impedance, and block transitions has been simulated to observe the detailed signal flow characteristics. Also, the numerous pickup shapes are thoroughly taken into consideration for achieving maximum signal transfer and minimum radiation losses.

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