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Study and simulation of cavity bunch length monitor based on monopole mode

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Bunch length measurement is an essential diagnostic for FEL facilities and now the interest of ultrashort bunch is continuously rising. The nondestructive methods with high resolution are now the favorite design for short bunches less than 1 ps. The technique of cavity bunch length measurement based on the monopole mode is discussed in this article. The influence of many factors on the amplitude of TM₀₁₀ mode are analyzed, such as energy and beam offset. For 1 ps beam length measurement, a cavity of 19.04 GHz is designed using CST software, which may provide a resolution of 10 fs with an 80 dB signal-to-noise ratio.

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Footnotes

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Yes

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