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Design of a parallel-feeding deflecting cavity with variable polarization

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Transverse deflecting cavity (TDC) providing time-dependent kick with fixed polarization is an important tool for beam diagnostics and manipulation. Recently, several types of novel TDC with variable polarization have been developed to fulfill the requirements of multi-dimensional phase space measurement of high-quality electron beam as well as fast scanning in proton therapy. Based on the parallel feeding technology, we propose a new design with alternating racetrack cells where the two chains are fed by waveguide networks independently. Each chain provides fixed polarization in either horizontal or vertical plane and variable polarization can be achieved by adjusting the amplitude and phase of the input power to the networks. The structure has several advantages, such as compactness, tunability, high shunt impedance, etc. In this manuscript, physical and mechanical design of this TDC will be presented in detail.

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Footnotes

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