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RF design for optimal high-gradient performance of a four-quadrant structure for the ASTERIX project

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The ASTERIX project, funded by CSN5 and proposed at INFN-LNF, aims to demonstrate a practical, meter-long X-band RF structure for linear accelerators made of hard copper and divided into four quadrants. The prototypes will be constructed by TIG welding. In the first year of the feasibility study, we will design the RF cavities for two full structures working at single-bunch and multi-bunch operation. In this paper, structures operating at single-bunch mode for ASTERIX are numerically studied. The surface field enhancements of the quadrant-type accelerating structures are the most challenging issue to be resolved. The geometry near the gap between four quadrants is carefully optimized and obtain low surface field while maintaining high RF performance.

Footnotes

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