

Development of additively manufactured 750 MHz RFQ

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Additive manufacturing technologies, especially powder bed fusion, are rapidly taking their place in the technological arsenal of the accelerator community. A wide range of critical accelerator components are today being manufactured additively. However, there is still much of scepticism whether additive manufacturing can address the stringent requirements set to complete accelerator components. Therefore, as an advanced proof-of-principle, a full-size, pure-copper RFQ prototype was developed and additively manufactured in the frame of the I.FAST EU project. RFQ prototypes and accompanying samples of the additively manufactured pure-copper parts were submitted to a series of standard tests at CERN to prove that this novel technology and suitable post-processing can deliver the required geometrical precision, surface roughness, voltage holding, vacuum tightness, and other relevant parameters. The results obtained are very promising and could be of great benefit to the linac community at large. The paper will discuss in detail the technological development and RFQ design improvement process along with the obtained results and future endeavours.

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