

Additive Manufacturing for Accelerators Components

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Accelerator components are traditionally fabricated using a wide range and combination of techniques: sheet metal forming, machining, vacuum brazing and welding. An alternative technique could be metal additive manufacturing (AM). AM process allows the fabrication of complex geometries with functional characteristics. AM is particularly relevant for prototypes or small series of parts, and for geometries difficult to fabricate with conventional processes. Currently, the most popular AM materials include stainless steel, aluminium, nickel and titanium alloys. RF components require the use of high-quality Oxygen Free Electronic (OFE) copper and/or pure niobium, neither of which is common within the AM industry. This paper introduces the relevance of AM for accelerator components and describes CERN's intentions in the additive domain considering also the qualification of AM for CERN's applications. Additionally, this paper presents the RF characterisation of AM waveguides in titanium alloy, together with the first developments of pure copper manufactured by the Electron Beam Welding process, in collaboration with Industry.

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