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Research on the design development of accelerator components by additive manufacturing

During the last decades, engineering inventions and technological developments are progressing significantly. Metal additive manufacturing and subatomic particle accelerators are relatively new technologies whose joint potential is not realized yet as an industrial solution. The main reason for that is low trustability and skepticism on quality, accuracy, and repeatability of additively manufactured parts from the accelerator community side. Furthermore, AM still has very limited applications in the high-energy physics field. Some additional causes of that are highly specific requirements like chemical purity, vacuum tightness, and voltage holding. These characteristics of AM products are not explored yet at enough level of trustability. However, AM technology already is certified for high complexity and high-performance parts in such fields as aviation, space, medicine, automotive, and other hi-tech level demanding industries. This talk contains a brief report on the first promising results of AM performance on pure copper HF-RFQ prototype design and manufacturing, including postprocessing, which is developed in H2020 I.FAST WP10.2. collaboration. This research is a step toward whole AM technology development for accelerator parts design and manufacturing to reduce life cycle costs and improve society's access to advanced technologies.

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