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## **M2Or4C-04: Additive Manufacturing of Nb cavities for quantum computing**

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Additive manufacturing is a promising technology for the fabrication of 3 D Nb cavities for quantum computing. We have used this method to generating 3D microwave resonators for QIS applications (resonators and memories). The need is for the highest possible Q-factor to improve the coherence time for cavity-qubit systems, to minimize de-coherence. Here we present our initial studies on developing the materials parameters and processes for optimal printing, including polishing and characterization of such 3 D cavities. We use a laser melting approach using high quality, spherical Nb powders. We have fabricated a number of 6 Gz (47.6 mm diameter) cavities based on designs from standard Nb forming processes. Processing parameters are discusses and the physical (material) aspects of the cavity are presented. Results from RRR and electron optics studies are shown, as well as surface roughness both before and after polishing. Plans for next steps are discussed, in particular the potential modifications possible by the additional freedom of the additive manufacturing approach.

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