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Mass production of 3.9 GHz 9-cell cavities at SHINE

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Two 3.9 GHz cryomodules of sixteen cavities are required in the Shanghai high-repetition-rate XFEL and extreme light facility (SHINE) linac. They are placed before the first bunch compressor to linearize energy distribution. A total of twenty-one 3.9 GHz 9-cell cavities including two prototypes were fabricated and tested. The first two prototypes reached a Q_0 of 2.9×10^9 at 13.1 MV/m and a maximum accelerating gradient of 20.0 MV/m during the vertical test, with a large margin with respect to the SHINE specification. The first prototype was integrated into a small cryostat and horizontal tested. Batch fabrication of nineteen cavities started after the prototype qualification. The 3.9 GHz cryomodules are under assembling after the vertical tests. Horizontal tests are planned to start from mid of 2024. This paper will introduce the experience of the prototype development and mass production of the 3.9 GHz cavities.

Footnotes

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