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High Q0 800 MHz cavity R&D for FCC

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800 MHz bulk niobium superconducting RF cavities are a fundamental, and sizeable, component of the FCC machine at all operating points. In the Booster, for Z, W, H, and ttbar operating points, there are 24, 56, 112, and 600 of these cavities respectively, with an additional 488 in the collider ring for ttbar operation. The FCC cavity performance specifications currently sit at the upper limit of what present-day techniques can achieve, and still incur a high RF power budget, in addition to generating substantial static and dynamic heat loads per cavity, driving up cryogenic costs. In order to deliver the most cost-effective, and thereby feasible version of the FCC, R&D efforts on 800 MHz RF cavities have begun, focusing on advanced surface treatments on 5-cell and single-cell 800 MHz prototypes. We report the first cold test results of these prototypes, and propose a course for future development.

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