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R&D of the C-band cryogenic copper parallel coupling accelerating structure at IHEP

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Abstract: In electron linear accelerators, the improvement of the acceleration gradient of the acceleration structure has been a continuous research topic for scientists, which can reduce the construction cost of the entire accelerator by increasing the acceleration gradient. Normally, large acceleration structures work on traveling wave made of ordinary conductive material oxygen free copper at room temperature. Recently, SLAC proposed C3 project. The distributed coupling acceleration structure of C-band cool copper material can achieve an accelerating gradient of over 120 MV/m in 77k liquid nitrogen, and has broad prospects for future applications. Institute of high energy physics has research on distributed coupling low-temperature structures at C-band. A parallel coupled standing wave structure was designed, manufacture, and cold tested. This structure consists of 20 cavities, with a length of approximately 0.5 meters. The cryogenic system has designed fabricated. High-power test will be done on existing test C-band test bench in Dongguan. This paper will provide a detailed introduction to the design process, project progress, and next step work plan

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