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DESIGN AND TEST OF DAMPED/HIGH GRADIENT/HIGH REPETITION RATE C-BAND ACCELERATING STRUCTURES FOR THE ELI-NP LINAC

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The linac energy booster of the European ELI-NP proposal foresees the use of 12, 1.8 m long, travelling wave C-Band structures, with a field phase advance per cell of $2\pi/3$ and a repetition rate of 100 Hz. Because of the multi-bunch operation, the structures have been designed with a very effective dipole HOM damping system to avoid beam break-up (BBU). They are quasi-constant gradient structures operating at 33 MV/m average accelerating gradient with symmetric input couplers. An optimization of the electromagnetic and mechanical design has been done to simplify the fabrication and to reduce their cost. The first full scale structure has been fabricated, tuned and tested at high power. In the presentation I will illustrate the main design criteria and all the experimental results with particular attention to the high power RF test that demonstrated the feasibility of the high gradient/high repetition rate operation.

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