

Superconducting Beta Graded Cavities Design for a proposed 350 MHz SC Linac for Waste Transmutation and Energy Production, D. BARNI, A. BOSOTTI, C. PAGANI, P. PIERINI, S. VISONÀ, G. GEMME*, R. PARODI*, INFN MILANO - LASA, Via Fratelli Cervi, 201 I-20090 Segrate (MI) Italy - A 100-1600 MeV, 25 mA, superconducting proton linac is under study by INFN for Waste Transmutation and Energy Production [1]. The linac will be split in three sections with elliptical five cell superconducting RF cavities (350 MHz) designed for synchronous beta of 0.5, 0.65 and 0.85. The first cavity type, beta = 0.5, will be built in bulk niobium, with a stiffening structure for mechanical stability. The two other cavity types will be made of copper with sputtered niobium. In this paper we describe the criteria used to optimize the design of the cavities. A cell coupling of 1.7% has been chosen, while peak electric and magnetic fields on the cavity surface below 15 MV/m and 40 mT are required by the machine scheme. A parametrization of the cavity geometrical parameters allowed the full control of the RF and mechanical properties of the cavities. To validate the choice of the final geometry high order modes and multipacting calculations have been performed. Prototypes of these cavities will be built and tested in a collaboration with CERN during 1998-1999.

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[1] C. Pagani, G. Bellomo, P. Pierini, in Proceedings of the XVIII Int. Linear Acc. Conf., Editors C. Hill and M. Vretenar, CERN 96-07 (1996), p. 107