

**Experimental Results on the Stainless Steel Prototype of a Superconducting RFQ,**  
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Universita' di Padova - At INFN-LNL the construction of a new injector for the superconducting booster ALPI was funded in fall 1996. The first accelerating cavities on the beam-line are two superconducting RFQ resonators (SRFQ1 and SRFQ2), which are being built in full niobium. A stainless steel prototype of SRFQ2 was built, with the aim of getting acquainted with all technologies related to the much more expensive superconducting version, particularly with the Electron Beam Welding (EBW) joints of the single components. RF tests were performed by means of the bead technique, in order to verify the agreements with the MAFIA code predictions on the distribution of EM fields in the structure, particularly at the end gaps, and to set up construction tolerances for the subsequent niobium resonator. The range of the slow tuner was also measured and compared with numerical predictions. Particular emphasis was given in the project to get a high mechanical rigidity of the structure: spectra of the mechanical eigenmodes of the resonator were taken and the results are compared with numerical predictions obtained through a dedicated code (I-DEAS). A last but fundamental scope of the prototype was also that of checking the behaviour of such a complex structure at liquid helium temperature, both in terms of alignment in the cryostat, change of the EM resonant frequency and possible mechanical deformations: latest results on this topic are also reported.