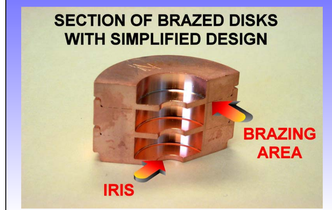
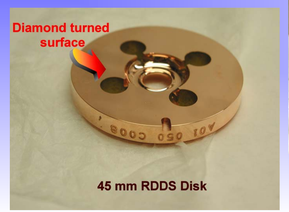
CONVENTIONAL LINEAR COLLIDER RF STRUCTURES R&D

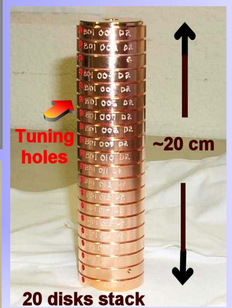
02-05-2002

RF DISKS

The basic elements of an RF structure are the disks. Disks are bound or brazed together in order to create a periodic structure that allows to accelerate a particle beam. The production tolerances for these elements are very tight: almost 1 µm. Failing in reaching these values results in a mismatch in the operating frequency of the whole structure.







CLEAN ENVIRONMENT

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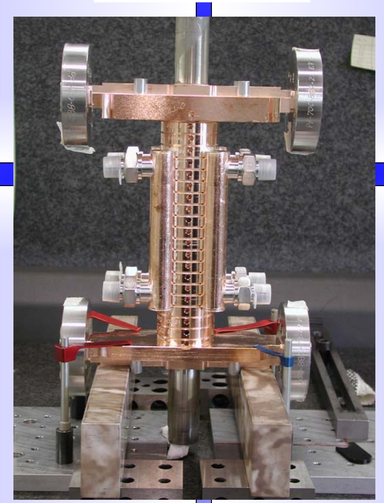
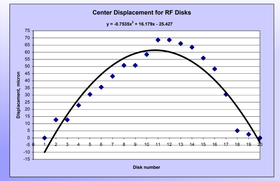
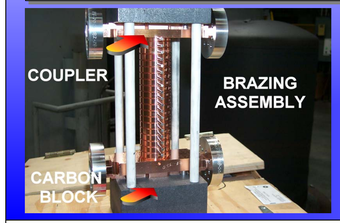
A factory has been established in the clean room area of the Industrial Building 4 in order to conduct linear collider RF structure fabrication R&D. The factory consists of two clean rooms, Clean Room A (class 5000) and Clean Room B (class 1000), interconnected by a semi-clean room that serves as an RF QC lab and technician work area.

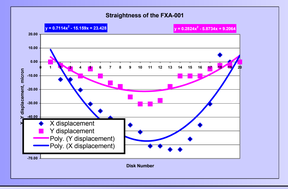


ASSEMBLY

Actually a brazing process is used to stack together the disks, later with the same technique the couplers and the water tubes for the cooling system are added. After the structure is completed a straightness quality control is performed. The two plots on the side show that a bow in the order of 100s µm can be generated during production. The minimization of this bow is one of the process goals.

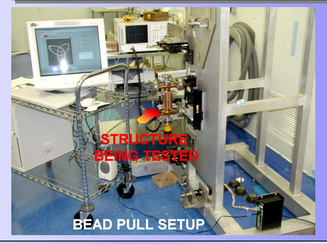


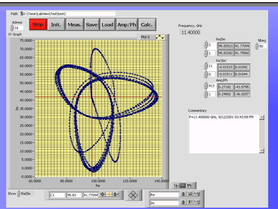




RF QC

The RF quality control is the key reference that allows to discover the overall performance of a structure. It is not just a control since during the operations it is also possible to correct some errors, the so called "tuning" process. This operation consists in deformation of the cell walls in predetermined points in order to modify their geometry and consequently RF parameters. Both Bead pull and Plunger measurement techniques are used.





Bead Pull Measurement Automatization