

International X-band Linear Collider Accelerator Structure R&D

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For more than fifteen years before the International Technology Recommendation Panel (ITRP) decision in August, 2004, there were intensive R&D activities and broad international collaboration among groups at SLAC, KEK, FNAL, LLNL and other labs for the room temperature X-Band accelerator structures. The goal was to provide an optimized design of the main linac structure for the NLC (Next Linear Collider) or GLC (Global Linear Collider). There have been two major challenges in developing X-band accelerator structures for the linear colliders. The first is to demonstrate stable, long-term operation at the high gradient (65 MV/m) that is required to optimize the machine cost. The second is to strongly suppress the beam induced long-range wakefields, which is required to achieve high luminosity. More than thirty X-band accelerator structures with various RF parameters, cavity shapes and coupler types have been fabricated and tested since 1989. A summary of the main achievements and experiences are presented in this talk including the structure design, manufacturing techniques, high power performance, and other structure related issues. Also, the new progress in collaborating with the CLIC, high gradient structures and X-Band structure applications for RF deflectors and others are briefly introduced.

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