

V115a Progress in Device Fabrication at SIS Cleanroom in NAOJ

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The SIS cleanroom at Advanced Technology Center of NAOJ is a superconducting device fabrication facility supporting ALMA-J project and other radio telescopes operated by NAOJ and universities. Two key research topics are currently focused aiming in significant breakthroughs in broadening the throughput of radio telescopes, namely broad frequency band(IF and RF) and focal plane arrays. For extra broad band receivers, SIS junctions of current density about ten times higher than conventional ones have been fabricated by using remote plasma nitridation of aluminum to form thin barriers. For compact SIS focal plane arrays, an innovative approach, hybrid planar integration, has been proposed and experimentally demonstrated. This technology has invoked various new methods and equipment in the SIS cleanroom, to name a few, deep RIE, PE-CVD and aligned wafer bonder. In addition to the research works for ALMA future development, standard highly producible SIS mixer fabrication process is being developed. The process is aimed to produce high-quality devices for operating radio telescopes.