

Upgrades to the CSO Heterodyne Facility Instrumentation: A 280-420 GHz Wide IF band Rx and beyond....

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The facility receivers of the CSO are in the process of being replaced by broadband (no-tuners), wide IF (4-8 GHz) state-of-the-art versions. The standard version will use a balanced mixer input, simplifying the LO input and canceling LO amplitude noise. Design and fabrication of the many individual components, e.g. mixers, low noise amplifiers, SIS junctions, optics etc. is now complete. A second style mixer, a 2 element balanced correlation receiver with one pixel on-source and one pixel off-source, has also been delivered. This instrument will be constructed after the facility receivers are upgraded.

To demonstrate the technology, and to facilitate extended baseline observations with the SMA (eSMA), a tunerless 280-420 GHz DSB single-ended receiver (Barney) has recently been deployed at the CSO. At the heart of the mixer is a high current density AlN SIS tunnel junction and a novel waveguide-to-thin-film microstrip transition that affords unprecedented tunerless RF bandwidth. The IF bandwidth of the new receivers is 4-8 GHz, though in principal IF bandwidth's up to 12 GHz are possible.

The presentation discusses a number of supporting technologies, and concludes with recent results obtained from 'Trex'; the 280-420 GHz wide IF bandwidth technology demonstration receiver.