

# HIGH RESOLUTION IF SPECTROMETER FOR SUBMILLIMETER APPLICATIONS

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**Abstract:** The spectral information of Intermediate Frequency (IF) signal available from heterodyne receiver system conveys information about Sub-millimeter (SMM) source. This spectrum may be obtained by processing the IF signal from a mixer (non-linear device) through a spectrometer. The commonly used spectrometers include Acousto-Optic Spectrometer (AOS), Auto Correlator Spectrometer (ACS) and Chirp Transform Spectrometer (CTS). AOS and ACS are routinely used due to their wide bandwidth. The CTS is state-of-the-art spectrometer, which provides very high frequency resolution, however, narrow bandwidth.

A very high frequency resolution CTS for future Submillimeter (SMM) wave applications is being developed at PRL. The initial part of the paper gives the details of system design of the spectrometer with negative chirp signal while latter part illustrates the Reflective Array Compressor (RAC) type Surface Acoustic Wave (SAW) chirp filter. The key element of CTS is SAW chirp filter, capable of providing 40 KHz frequency resolution and 200 MHz bandwidth. Initial design optimization of SAW-RAC chirp filter has been completed. Plans for device fabrication will be described at the meeting.