

XII. MICROWAVE AND MILLIMETER WAVE TECHNIQUES

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1. RESEARCH OBJECTIVES

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Bernard F. Burke

The work of the group emphasizes the development of highly sensitive, stable, wideband receivers, and the use of radio-interferometric methods to achieve high angular resolution at radio wavelengths. The methods use both hard-wired aperture-synthesis interferometers and Very Long Baseline Interferometry (VLBI). Our present emphasis is as follows:

1. Developing low-noise cooled mixers for the wavelength region 3-8 mm. The agreement between calculated and observed noise temperature for a prototype 7-mm mixer is good, and a new broadband model is being developed. The mixers will be used for spectral-line studies of interstellar molecules and for VLBI work.

2. Developing a highly stable multichannel low-noise FET amplifier for 2-cm wavelengths. The system will be cooled, aiming for 1-GHz bandwidth and 100°K system noise. The ultimate goal is to build a radio imagery system for paraboloidal antennas to search for fluctuations in the cosmic microwave background.

3. Making detailed engineering studies for a space VLBI station for use on the NASA space shuttle.

