Enclosure #1
Ltr. No. 64-52,333

Investigation of the Propagation of Millimeter
and Submillimeter Waves
Contract No. NASw-963
Monthly Letter Report
Period: 1 October to 31 October 1964

Experimental work continues with presently available Fabry-Perot interferometers. Techniques of Q measurement are being refined to allow more accurate attenuation measurements by this method. However, the low Q-value of the existing interferometers will not allow attenuation measurements for off resonant absorption. A new interferometer has been designed and construction is expected to be complete on November 5. It is a semiconfocal design with plates eight inches in diameter, separated by eighteen inches. A Q-value between 10^5 and 10^6 is expected.

A previously unobserved water absorption line at a harmonic of 74.6668 gc has been found; cross-checking to establish which harmonic is under way. As soon as sufficient lines have been observed, a computer program will be employed to obtain more accurate molecular constants which will allow the remaining lines to be located more easily.

Search has begun for the 424 gc absorption line of oxygen in the spectrometer with the new magnetic modulation system.

A major problem is the harmonic generation from the carcinotron. A second harmonic has not yet been surely propagated down a wave guide; probably the difficulty is due to moding in an oversized wave guide, reducing the energy density on the non-linear element. A new harmonic generator with wave guide of the correct size for the fundamental mode is under construction. No other difficulties have been encountered.

563.6 hours were worked during the reporting period.

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