

RAMAN SCATTERING FROM ATMOSPHERIC NITROGEN IN THE STRATOSPHERE

by

M. J. Garvey & G. S. Kent

Department of Physics, University of the West Indies

ABSTRACT

The Mark II laser radar system at Kingston, Jamaica, has been used to make observations on the Raman shifted line from atmospheric nitrogen at 828.5 nm. The size of the system makes it possible to detect signals from heights of up to 40 kilometres. The effects of aerosol scattering observed using a single wavelength are almost eliminated, and a profile of nitrogen density may be obtained. Assuming a constant mixing ratio, this may be interpreted as a profile of atmospheric density whose accuracy is comparable to that obtained from routine meteorological soundings.

In order to obtain an accurate profile several interfering effects have had to be examined and, where necessary, eliminated. These include:

- 1) Fluorescence in optical components
- 2) Leakage of signal at 694.3 nm.
- 3) Overload effects and non-linearities in the receiving and counting electronics.

Most of these effects have been carefully examined and comparisons are being made between the observed atmospheric density profiles and local meteorological radio-sonde measurements. Good agreement has been obtained over the region of overlap (15 - 30 Km), discrepancies being of the same order as the experimental accuracy (1-10%), depending on height and length of period of observation.