A FABRY-PEROT INTERFEROMETER AND ITS APPLICATIONS
TO MEASUREMENT OF THE THERMOSPHERIC
TEMPERATURES AND WINDS

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Parallelism Control
Three Phase Oscillator
PIN Diode Preamplifier
Bandpass Filter and Phase Sensitive Detector
The Equalizer
600V Supply
Stabilized Power Supplies
Adjustments

Separation Control
10 kHz Oscillator
Differential Amplifier
10 kHz Rectifier
Equalizer
Scan Input Attenuator

Temperature Control
Error Amplifier and Triac Trigger
Triac Switch

Pulse Counting Electronics
Preamplifier and Discriminator
Ratemeter

Photomultiplier Shutter Control Electronics

BIBLIOGRAPHY
A 15cm scanning Fabry-Perot Interferometer was used to measure the
doppler width and shift of the atomic oxygen [OI] λ630nm line in the
night airglow. From these measurements over a 12 month period at Mt.
Torrens (near Adelaide) kinetic temperatures and neutral wind veloci-
ties have been determined.

The theory of the Fabry-Perot Interferometer (FPI) is presented
with emphasis on the criteria involved in the selection of operating
parameters. The development of the FPI constructed in the Mawson
Institute for Antarctic Research is outlined and a detailed description
of the instrument is then given. Full particulars are given of the
servo-systems which were developed to control parallelism and separa-
tion of the FPI plates and to maintain high thermal stability within
the instrument.

The detection of very low light levels such as are encountered in
the night airglow, was the subject of considerable investigation. Work
carried out in this area led to refinements in the detection system
which increased the signal-to-noise ratio by almost two orders of
magnitude.

Observations during periods of low magnetic activity revealed
diurnal patterns in temperature and wind velocity broadly in agreement
with previous observations. The zonal component of the neutral wind is
observed to have a pronounced seasonal variation.

Enhancements of the temperature and the meridional component of
the wind were found always to accompany magnetic disturbances. Equator-
ward winds with velocity greater than 200m/sec were found to be
present even during fairly minor magnetic disturbances.