

EVIDENCE OF EXPANSION IN THE CENTRAL REGION OF NGC 2346

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ABSTRACT. We present observations of the bipolar planetary nebula NGC 2346 carried out with the 1-m telescope at the Vainu Bappu Observatory in Kavalur, India using (1) a high resolution piezo-electric scanned Fabry-Pérot Spectrometer (with a velocity resolution of 10 km s^{-1}) for line studies in the 6000 Å - 7000 Å spectral range and (2) a pressure scanned Fabry-Pérot spectrometer (with a velocity-resolution of 5 km s^{-1}) in the green region. The nebula was observed in the H I 6563 Å and [N II] 6583 Å emission lines using a 15" aperture and in the [O III] 5007 Å line using an 8" aperture centered on the bright central spot. A number of scans in each of these lines were co-added to improve the signal-to-noise ratio. The [O III] profile shows a well defined split between the blue and the red component, typical of an expanding shell. The [N II] profile does not show a well resolved split, although a pronounced suggestion of a split was observed in all the scans. The H α profile was broad and asymmetric. The composite [O III] and [N II] profiles were decomposed into two individual Gaussians for obtaining the expansion velocity.

TABLE 1. EXPANSION VELOCITY

Emission Line	Expansion Velocity
[O III] 5007 Å	8 km s^{-1}
[N II] 6583 Å	11 km s^{-1}

A rough estimate of ion temperature was also made using the widths of the individual Gaussians in the [N II] and H I profiles. Assuming that the H I and [N II] lines originate from the same region of the nebula and that microturbulence is uniform throughout, we obtain temperatures of 7800 K and 14500 K respectively for the approaching and receding shells of the nebula. These temperatures may be compared with the electron temperature of 14200 K measured by Sabbadin (1976, *Astron. Astrophys.*, 52, 291) using the [N II] line ratio.