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Imaging Fabry-Perot spectroscopic observations on the planetary nebula NGC 1514

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1. Introduction

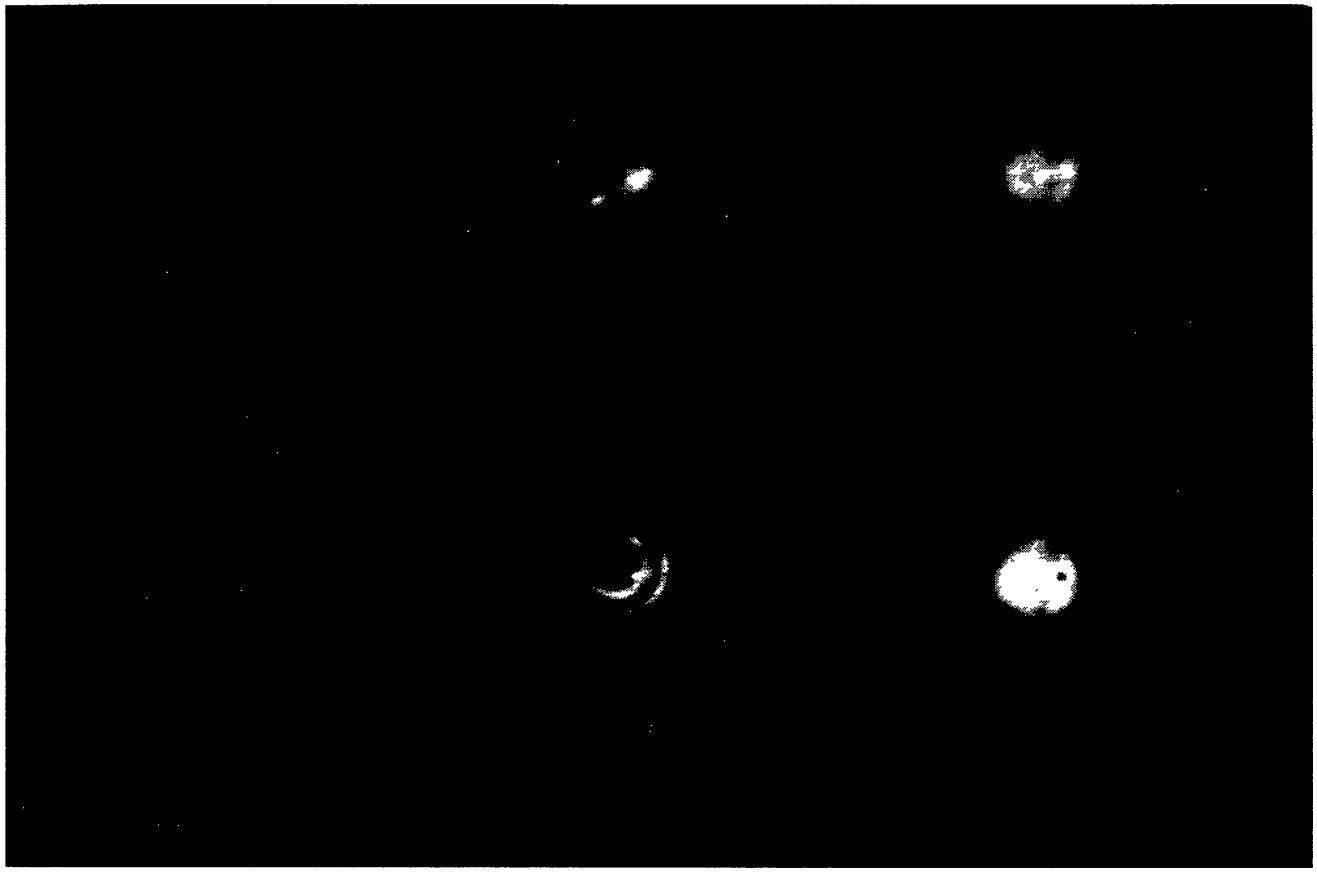
The planetary nebula NGC 1514 (PK 165-15o1) in Taurus is morphologically round, amorphous and has multiple shells. It is a moderate to high ionization nebula with an eclipsing binary as its central star and hence a prominent butterfly or bipolar morphology is expected according to some theoretical models. However the structure as seen in H alpha and [OIII] images depicts only a moderate bipolar morphology.

It is important to study in detail the kinematics of such a planetary nebula in order to understand the interaction of winds from the binary central star with the progenitor AGB wind. To our knowledge, so far only the work of Sabbadin & Hamjaoglu (1982, A & A, 110, 105) gives the overall expansion velocity of the nebula and hence detailed kinematic observations are necessary. Fabry-Perot spectroscopic observations in the [OIII] 5007 A line in NGC 1514 using the 1.2 m telescope at Gurushikhar, Mt. Abu. Observational details and some preliminary results are presented here.

Nebular parameters : Angular diameter = 123" (0.160 pc), distance = 0.6 kpc central star brightness = 9.42 mag in V.

2. Observations

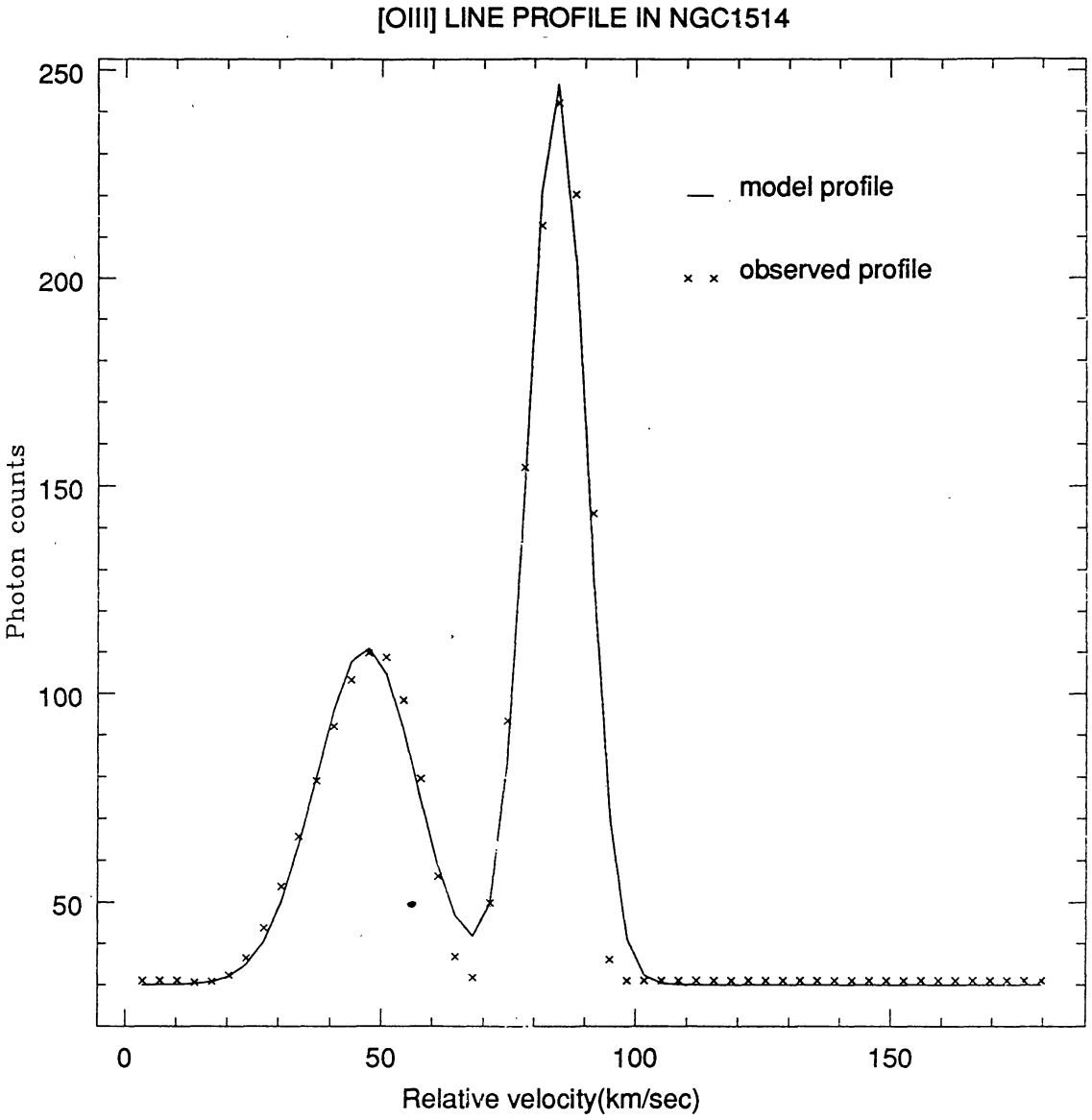
Our observations were made using PRL Imaging Fabry-Perot Spectrometer (IFPS) with seeing-limited (~2-3 arc sec) spatial resolution and high spectral resolution (in terms of velocity it is ~ 7 km/s). We have imaged this nebula in [OIII], H alpha and [NIII] lines using narrow-band interference filters. Fig 1 shows [OIII] filtergram and interferogram, and filtergrams in H alpha and in [NII] (moving from top left corner in clockwise direction). Several [OII] interferograms have been taken on this nebula at different gap-settings of the piezo-scanned FP etalon to obtain detailed spatiokinematic information.



Instrumental parameters :

Free Spectral range of the Fabry-Perot etalon (piezo-scanned)	3 Å
Finesse	25
Bandwidth of the filter	15 Å
Spatial resolution	~2-3"
Spectral resolution (2 km/s in positioning the line centroid)	7 km/s (in velocity)

All filtergrams were taken with integration time of 5 mts and the interferograms of 15 mts.



3. Preliminary results

The analysis of the data has just begun and some preliminary results are reported here. We get the expansion velocity of the nebula which corresponds to the maximum split of the spectral scan at the centre of the nebula. The observed profile is fitted with a model profile to get the expansion velocity. We are reporting the expansion velocity of the nebula profiles at two different positions showing the maximum split.

Expansion Velocity at Position 1 (10 arcsec from central star at P.A. of 240° (Fig. 2) = 20 km/s. Expansion Velocity at Position 2 (16 arcsec from central star at P.A. of 180° (Fig. 3) = 20 km/s.