

## DISCOVERY OF A PLANETARY NEBULA ASSOCIATED WITH THE WHITE DWARF GD 561

R. NAPIWOTZKI and D. SCHÖNBERNER

*Institut für theoretische Physik und Sternwarte der Universität, Olshausenstr. 40,  
W-2300 Kiel, Germany*

The search for old planetary nebulae around hot white dwarfs, PG 1159 stars, and sdO stars is subject of intensive studies (e.g. Kwitter et al. 1989). We report here on the discovery of such a nebula around the white dwarf GD 561.

GD 561 (WD 2342+806) was discovered by Giclas et al. (1970). It was classified as DAO by Bergeron et al. 1992. A comparison of a spectrogram of GD 561, taken by us, with the DAO central stars of S 216 and NGC 7293 shows striking similarity. From a preliminary analysis of the Balmer lines we got  $T_{\text{eff}} = 50,000 \text{ K} \dots 60,000 \text{ K}$ . But according to the discussion in Napiwotzki (1992 and these proceedings) this determination needs further scrutiny.

In the background of our exposure the forbidden O III lines at 4959 Å and 5007 Å, typical for a PN, are clearly visible. The associated nebula was listed before in the catalogue of Sharpless (1959) as H II region (S 174). The distance of S 174 was determined by Fich & Blitz (1984) from its radial velocity using the galactic rotation curve to be 220 pc. The distance is in agreement with the estimated distance of GD 561. The resulting radius (0.3 pc) is consistent with the interpretation of S 174 as being an old PN. The position of GD 561 is not at the center but near the outer rim of the PN. But this is not unexpected: the central stars of very old PN are very often off-center. We conclude that GD 561 is the central star of S 174.

### References

- Bergeron, P., Saffer, R.A., Liebert, J., 1992, ApJ, in press  
 Fich M., Blitz, L., 1984, ApJ 279, 125  
 Giclas, H.L., Burnham, R., Thomas, N.G., 1970, Lowell Obs. Bull., 7, 183  
 Kwitter, K.B., Massey, P., Congdon, C.W., Pasachoff, J.M., 1989, ApJ 97, 1423  
 Napiwotzki, R., 1992, Proc. Kiel/CCP7 workshop on Atmospheres of Early Type Stars, eds. U. Heber, S. Jefferey, Springer, p. 310  
 Sharpless, S., 1959, ApJS 4, 257