

INTERSTELLAR REDDENING TOWARDS S188, HW4 AND We1-6

W. SAURER^{*,**}*Institut für Astronomie, Leopold-Franzens-Universität, Technikerstr. 25, A-6020 Innsbruck, Austria*

Abstract. Photoelectric UB_V photometry of stars was carried out in the angular vicinity (radius = 15') of 3 planetary nebulae. An extinction distance relation was constructed for the line of sight towards each planetary nebula. This relation was verified by published data on nearby stars and star clusters. The distances derived are 850 ± 300 pc for PK 128 -04 1 (S 188, Simeis 22), 400 ± 200 pc for PK 149 -09 1 (HW 4), and (less reliable) $800 \text{ pc} \pm 400 \text{ pc}$ for PK 224 +01 1 (We 1-6). For the central star of PK 224 +01 1 our observations gave $V = 15.76 \pm 0.03$ mag, $(B-V) = -0.08 \pm 0.03$ mag and $(U-B) = -0.87 \pm 0.03$ mag.

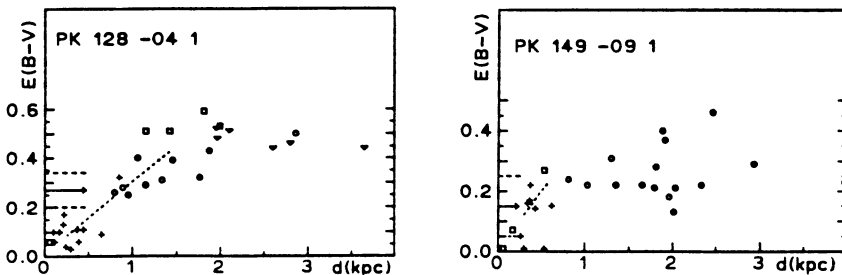
Key words: planetary nebulae: individual, PK 128 -04 1, PK 149 -09 1, PK 224 +01 1

The determination of individual distances of planetary nebulae (PN) remains still a serious problem. As a consequence, the number of distances known with uncertainties smaller than 40% is limited to a few dozen.

One method to derive reliable distances to individual PN is the "extinction distance method" or "reddening distance method".

To demonstrate the influence of the patchy interstellar obscuration, we have carried out star counts on the Palomar Observatory Sky Prints (POSS) in several fields (area = 5.4 arcmin²), symmetrically arranged within 1° around the PNs. The result is that the patchiness of the interstellar medium does not play a predominant role for the regions around PK 128 -04 1 and PK 149 -09 1, whereas this might not be true for PK 224 +01 1.

To obtain an accurate extinction distance relation a two-dimensional classification of all measured stars is required. As a matter of fact, this is not uniquely possible by applying three-colour photometry only. We have tried to overcome our ignorance of the luminosity class (LC) and spectral type in the following way. From the two colour diagram we derived $E(B-V)$ and the corresponding value of the distance for the LC IAB, III and V using the relation $E(U-B)/E(B-V) = 0.72 + 0.05 E(B-V)$ and the intrinsic colours and visual absolute magnitudes given by Schmidt-Kaler (1982, Landolt-Börnstein). The aim of this method is to find a most probable functional relationship between reddening and distance. The extinction-distance relations of two PN studied are shown below.



* Visiting Astronomer at the Centro Astronomico Hispano-Aleman, Calar Alto, operated by the Max-Planck-Inst. für Astr., Heidelberg, jointly with the Spanish Nat. Comm. for Astronomy.

** This work was supported financially by the local government (Tiroler Landesregierung).