THE STRUCTURE AND VELOCITY FIELD OF A78.

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We present a velocity field of the planetary nebula A78 based on three Fabry Pérot Hα (10A) interferograms taken with a focal reducer attached to the 2.1 m reflector of the Observatorio Astronómico Nacional at San Pedro Mártir, Mexico. We have used a single-stage Varo image intensifier and two different étalons with interorder separations of 283 km s^{-1} (2 interf.) and 100 km s^{-1} (1 interf.). The scale of the original photographs is 49 arcsec mm^{-1}. Our data have yielded radial velocities in the Hα line at 110 points on the face of A78; the velocity field is far from being smooth. The rings are wide around the central hole, and a few show definite splittings; from these splittings we have estimated an overall expansion velocity of 27 km s^{-1}. The average systemic velocity is found to be around -3 km s^{-1}.

Two direct images in the Hα line were obtained with the focal reducer at the 2.1 m telescope. The image in Hα has a regular oval outline with a small hole around the central star. At the edges near the "minor axis" the brightness is enhanced. There exist filamentary details within the nebula, and these coincide with the nearly circular faint filaments shown on the PSS red image. For an overall discussion of the velocity structure the Hα image was divided into two halves along the minor axis. Referred to the standard of rest of the nebula, the NW half has yielded a velocity of -6.7 km s^{-1} and the SE half, +5.9 km s^{-1}. The average velocities along the two rings in the NW half and those at the SE half are comparable with the respective average velocities in the regions where they are embedded.

Our material does not allow a unique model to be advanced for the formation of A78; however, based on the morphology of the filaments resembling a helix and the velocity field, we may state that: The outflow of gas from the progenitor has definitely not been isotropic. The outflows may have occurred from a direction oblique to the rotation axis of the central star. The helical structure of the filaments and the velocity field are consistent with this picture provided the rotation axis makes a small angle with the line of sight. Further data with higher precision will be needed before a definite mechanism can be proposed.

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