The central stars of the planetary nebulae NGC 7027 and NGC 6543

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Infrared spectra of NGC 7027 and NGC 6543 ranging from 2.4 μm to 45 μm were obtained with the Short Wavelength Spectrometer on board the Infrared Space Observatory. A first analysis of these spectra, with the aid of photo-ionization models, is presented in Beintema et al. (1996).

We report the first detection of the [Ar VI] 4.53 μm and [Ne VI] 7.65 μm lines in the spectrum of NGC 7027 (Fig. 1.1). When compared with older observations it is clear that the [Ar VI] line and possibly also other lines have increased in strength since 1981. We argue that a likely explanation for this variability is a change in the spectral energy distribution of the central star, possibly an increase in effective temperature. However, this result needs to be confirmed by further observations.

We also report a non-detection of the [O IV] 25.9 μm line and the first detection of the [Na III] 7.32 μm line in the spectrum of NGC 6543. The non-detection is not expected based on a blackbody approximation for the spectrum of the central star. The ionization threshold for O^{3+} is just beyond the He II limit, and the absence of this line shows that the stellar flux drops at least by a factor 350 at the He II limit. Modeling the [O IV] line may prove to be a valuable test for atmosphere models.

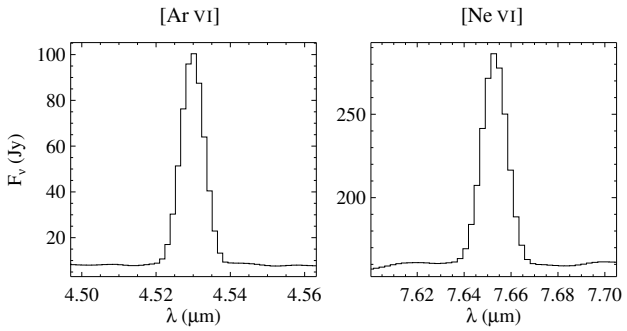

Figure 1.1: The observed [Ar VI] and [Ne VI] lines in the spectrum of NGC 7027.

REFERENCES

Beintema D.A., van Hoof P.A.M., Lahuis F. et al., 1996, A&A, 315, L253