

OBSERVATIONS OF INTERSTELLAR O VI ABSORPTION AT 3 KM/S RESOLUTION

E.B. JENKINS

*Princeton University Observatory
Princeton, NJ 08544-1001, USA*

U.J. SOFIA

*Dept. Astron. & Astrophys.
Villanova University
Villanova, PA 19085, USA*

AND

G. SONNEBORN

*Code 681
NASA Goddard Space Flight Center
Greenbelt, MD 20771 USA*

1. Introduction

For studies of diffuse gases in the temperature range $10^5 - 10^6$ K, observations of O VI absorption in the spectra of background stars provide an important supplement to information from surveys of soft x-ray emission. We report here the first observations of O VI absorption recorded at a resolution of 3 km s^{-1} for the stars 15 Mon and HD 64760. Both stars are behind regions that are suspected to be old supernova remnants. The observations were made with the Interstellar Medium Absorption Profile Spectrograph (IMAPS) during its flight on the ORFEUS-SPAS II mission in late 1996.

2. 15 Mon

15 Mon is 1.2 kpc away from us, and it appears within the boundary of the diffuse x-ray emission of the Monogem Ring (Plucinsky, *et al.*, 1996). The spectrum of 15 Mon in the vicinity of the O VI 1032 Å feature is shown in Fig. 1. Velocities less than about -100 km s^{-1} could not be registered for

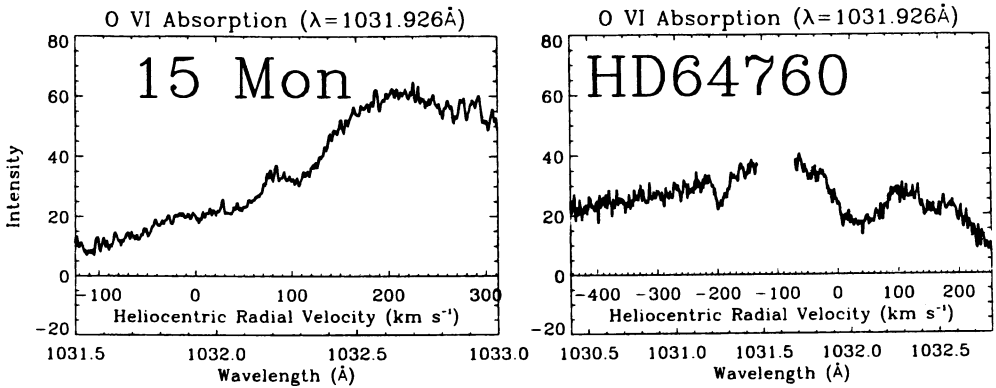


Figure 1. IMAPS observations of O VI absorption in the spectra of 15 Mon and HD 64760

this star because the stellar flux was too low. There is a very broad O VI feature centered at a heliocentric radial velocity of about $+35 \text{ km s}^{-1}$ and a stronger, asymmetric one with a peak absorption at $v = +105 \text{ km s}^{-1}$. Possibly related to the high-velocity O VI feature are Mg II absorption features at $v = +57$ and $+86 \text{ km s}^{-1}$ that can be seen a spectrum in the HST archive.

3. HD 64760

HD 64760 (distance = 1 kpc) appears well inside the borders of the Gum Nebula, a structure that may be an old supernova remnant that is about about 2×10^6 yr old (Leahy, *et al.*, 1992). Fig. 1 shows a very strong, symmetric O VI feature centered at $v = +35 \text{ km s}^{-1}$ situated between two high velocity components – one at $v = -195 \text{ km s}^{-1}$ and another at $v = +155 \text{ km s}^{-1}$. The depth (45%) and width (80 km s^{-1} FWHM) of our O VI feature centered at $v = +35 \text{ km s}^{-1}$ are both greater than those of the model prediction of Slavin & Cox (1992) (30%, 35 km s^{-1} FWHM) for a SNR of this age. As with the features in the spectrum of 15 Mon, the broad feature does not seem to be composed of a random superposition of many narrower features.

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References

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