DEPTH STRUCTURE IN THE GAS IN SHAPLEY III ALONG THREE LINES OF SIGHT

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Shapley Constellation III in the Large Magellanic Cloud (LMC) is surrounded by a ring of HII regions, called Supershell LMC 4 (Meaburn 1980). In the direction of the centre of this spatial strucutre very little neutral interstellar gas is found (McGee & Milton 1964). The spatial arrangement suggests that a hole exists in the gas layer of the LMC, one which may be blown out by the effect of the winds of the stars of Constellation III or by supernova blasts from the same area. Shock waves moving into surrounding neutral gas triggered star formation in the outer shell. Left inside would be a volume of diluted, and probably hot, ionized gas.

To probe the spatial structure of the gas we have collected high dispersion IUE spectra of some stars inside LMC 4. We have analysed the interstellar lines from the various elements and ions available and are able to derive the velocity structure of the lines of sight observed (Bomans & de Boer 1989). We see a well-defined absorption component near 230 km s^{-1} and a broader structure around 280 km s^{-1}. The column density of neutral gas is small, as confirmed from the HI 21-cm profiles of Rohlfs *et al.* (1984). We have redetermined the spectral type of the stars from the IUE spectra in order to estimate the strength of the stellar Lyman-Alpha (Lα) line. Two stars are of early enough type to allow the determination of N(H) from Lα.

The dynamics of the gas of LMC 4 is unclear. There is a rather large spread in the velocities of the HI 21-cm components (Bomans *et al.* 1990), as derived from the Rohlfs *et al.* (1984) data. Our analysis does not lead unambiguously to the expanding shell structure as proposed by Dopita *et al.* (1985). Rather, the 21-cm data indicate a chaotic velocity strcture.

From the metal absorption lines we can derive column densities of Si, S, Fe, and Zn in the two gas components. Numbers are given in Table 1. The column densities are related to S, an element which does not deplete due to dust grains. The abundances found compare favourably with results for LMC gas from other studies (see de Boer 1990). The abundance ratio of Zn to S is close to the solar value. Si shows little depletion, in particular in the 230 km s^{-1} gas.

Table 1. Logarithmic relative abundances X/S seen toward LMC 4

	Sk -67 206		Sk -66 118		Sk -66 100		R136	Sun
v(rad)	230	280	230	280	230	280		
SiII	-0.1	-0.7	0.6	-	0.2	-0.6	-0.4:	+0.3
FeII	-1.1	-0.5	-0.1	-	-0.9	-0.9	-	+0.3
ZnII	-2.7	-1.6:	>-2.5	-	-	-2.9:	-3.2	-2.6
N(SII)	14.7	15.4	14.7	-	14.2:	15.6		

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The presence of absorption by CIV in the spectra of two stars (Sk -66 206 and Sk -66 100) at 250 km s^{-1} is very interesting. The column density amounts to approximately log N(CIV) > 13. If this represents gas in collisional ionization, and if one assumes for the C abundance the value found from emission lines, C/H = -4.1 (Dufour 1984), then this is equivalent to log N(HII) > 18 of ionized gas. Since it is likely that the stars are in the rear of Constellation III and assuming that LMC 4 is spherical, the line of sight to the stars (both are somewhat to the side of LMC 4) would go through perhaps 500 pc of ionized gas. Thus, one would find a density of n(H+) > 10^{-3} cm^{-3} and a pressure of > 100 cm^{-3}K.

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