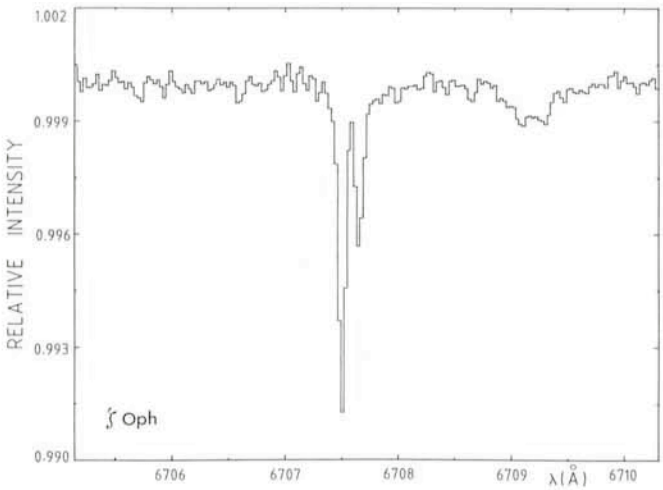

Fig. 4: *The interstellar lithium absorption line toward ζ Ophiucci, E(B-V) = 0.32. This spectrum is the sum of 34 exposures representing a total of 17 hours integration time. The signal-to-noise ratio (RMS) is ~3950. The intensities have been normalized to the continuum.*

expected soon will be to feed the CES directly from the 3.6 m prime focus through fiber optics and/or to implement a CCD detector instead of the Reticon.

Among other interstellar investigations, the last (but not least) we will speak about concerns the lithium abundance. As deuterium, the two isotopes of lithium are not of stellar origin. The existence of ^{6}Li is rather well explained by spallation reactions between galactic cosmic rays and interstellar gas. For the larger abundance of ^{7}Li, additional sources must be found. The main one is production during the primeval Big Bang, but complementary sites of creation have been proposed like red giants and nova outbursts. The interstellar lithium abundance and ^{7}Li/^{6}Li ratio are therefore key parameters to evaluate the relative weight of production and destruction processes, to check models of nucleosynthesis and of chemical evolution of galaxies, finally to provide a further test (beside deuterium and helium abundances) on the geometry of the Universe. The only accessible resonance line of lithium is the doublet of Li I at 6708 Å (151 mÅ of separation, the ^{6}Li I doublet being redshifted by 160 mÅ). The best result was obtained in collaboration with M. Dennefeld toward the 09.5 star ζ Oph which is known to shine behind a well studied interstellar cloud (Fig. 4). In order to derive the ^{7}Li/^{6}Li ratio for the first time outside the solar system, we have conducted a profile fitting analysis. In the best determined cloud, we find a temperature of less than 50 K. In this particular component, the solar ^{7}Li/^{6}Li (12.5) does not fit the data and must be replaced by a value between 25 and 180 (most probably 38). After correcting for the unobserved dominant ionization state Li II, the interstellar ^{7}Li/H ratio is found to be 1.2×10^{-10} (Ferlet and Dennefeld, 1982, *Ap.J.* submitted).

Finally, in the vicinity of the lithium lines, we have detected in several lines of sight faint absorption lines which could be due to the molecular ion CS^+ (Fig. 5). If the identification is confirmed—this requires accurate theoretical computations of laboratory wavelengths—the interstellar chemistry will have to thank the CES + Reticon for discovering an important new molecule.

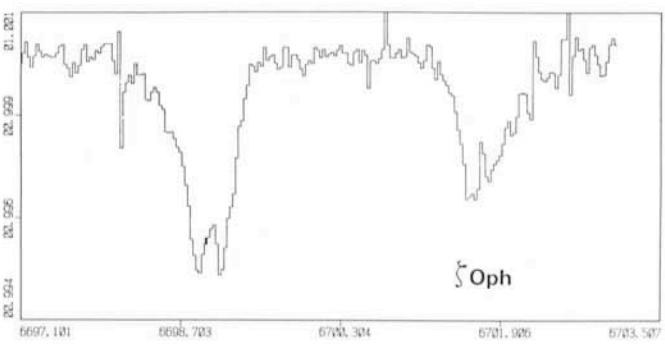

Fig. 5: *Possible new interstellar absorption lines due to the molecule CS^+ toward ζ Oph. Same spectrum as in Fig. 4. The equivalent widths of the two features are of the order of 3 and 2 mÅ.*

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