A comparison between the laboratory records and solar tracings obtained both at Lake Angelus and at Mt. Wilson shows that all of the CH_4 bands observed in the laboratory are also present in the solar spectrum. Since the bands originate in the earth's atmosphere, the line intensities show a strong dependence upon solar altitude. The two bands at 1.7μ are very weak and require about three air masses (3.3 cm of CH_4 at NTP) for visibility in the solar spectrum. On the other hand, the lines of the four combination bands in the 2μ region are both strong and numerous even on noon-day tracings. About 330 lines of CH_4 in the spectral region 2.15μ–2.45μ appear on solar tracings obtained both at Lake Angelus and at Mt. Wilson with various air masses ranging from 1 to 13. We estimate that between one-third and one-half this number would be produced by a single air mass. Furthermore, about 50 percent of all telluric lines in this spectral region are accounted for by CH_4. The majority, if not all, of the remaining lines, are due to H_2O. It is expected that the water vapor lines can be identified by comparisons between solar tracings obtained under varying concitions of humidity.

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Atmospheric HDO

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THE appearance of the ν_2 absorption of HDO in the solar spectrum has been reported by Adel.[1] In the course of measurements made to determine the absolute transmission of the atmosphere for a horizontal path of 2264 yards over sea, we have found an absorption at 3.67 microns that corresponds to the

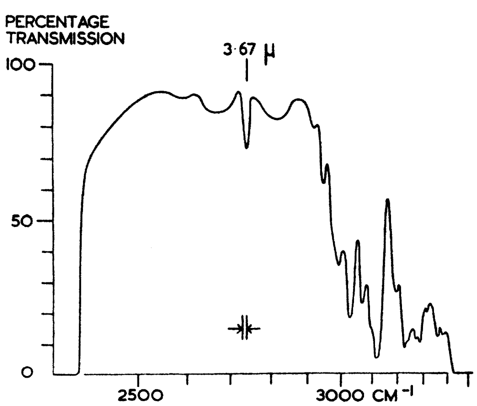

Fig. 1. Atmospheric transmission 2.7–4.3 microns. Path length 2264 yards; precipitable water 17 mm.

Q-branch of ν_1 HDO. Absorptions corresponding to the P and R branches are also observed.[2] Figure 1 shows a typical transmission curve taken with a lithium fluoride prism.

A full account of the work will be published in due course.

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Disintegration Electrons from Li_3^8 Nuclei Ejected in Cosmic Stars

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THE well-known hammer tracks occurring occasionally in cosmic-ray stars have been shown[1] to be almost certainly due to the ejection of Li_3^8 nuclei which disintegrate at the end of their range leaving Be_4^8, which then splits up into two oppositely directed α-particles. A further convincing proof of this would be to see the Li_3^8 disintegration electron coming from the origin of the α-particles. In a particularly sensitive batch of Ilford G5 emulsions we have now observed four cosmic stars showing hammer tracks, in each of which the Li_3^8 disintegration electron can be clearly seen. A mosaic of photo-micrographs of one such event is reproduced in Fig. 1.

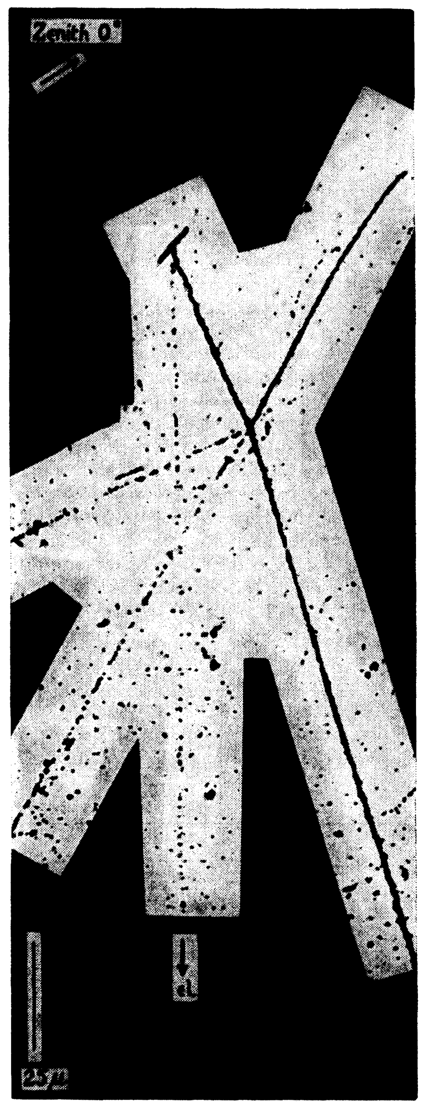

Fig. 1. Photograph of mosaic of photo-micrographs of a 5-pronged cosmic star found in an Ilford G5 emulsion, with Li_3^8 nucleus ejected. This shows the characteristic hammer track, and also the Li_3^8 disintegration electron. The zenithal direction for the event is indicated on the photograph.