wake of the entering cometary fragment (Crawford et al. 1994). The arrival time of the first brightening four minutes after the nominal impact time as observed by Galileo is significantly larger than the 50 seconds predicted by these authors for a 3 km ice body. This indicates that the size of fragment L must have been significantly smaller. The role played in the impact process by the flare of 90 s duration is still unclear.

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SL-9 FRAGMENTS A, E, H, L, Q1 COLLISION ONTO JUPITER: MID-INFRARED LIGHT CURVES

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A coordinated program of mid-IR observations of the comet Shoemaker-Levy 9 crash onto Jupiter has been conducted from 3 telescopes: the Nordic Optical Telescope at La Palma, the 3.6m ESO telescope at La Silla and the CFHT at Hawaii. The prime aim was the search for temperature fluctuations associated with seismic waves, possibly generated during the crash. Such a detection would be of valuable interest, as it would give unique information about the Jovian interior. It is too early in the process of data reduction to give meaningful results about seismic waves. However we can already report on the unexpected huge IR spot seen after the impacts.

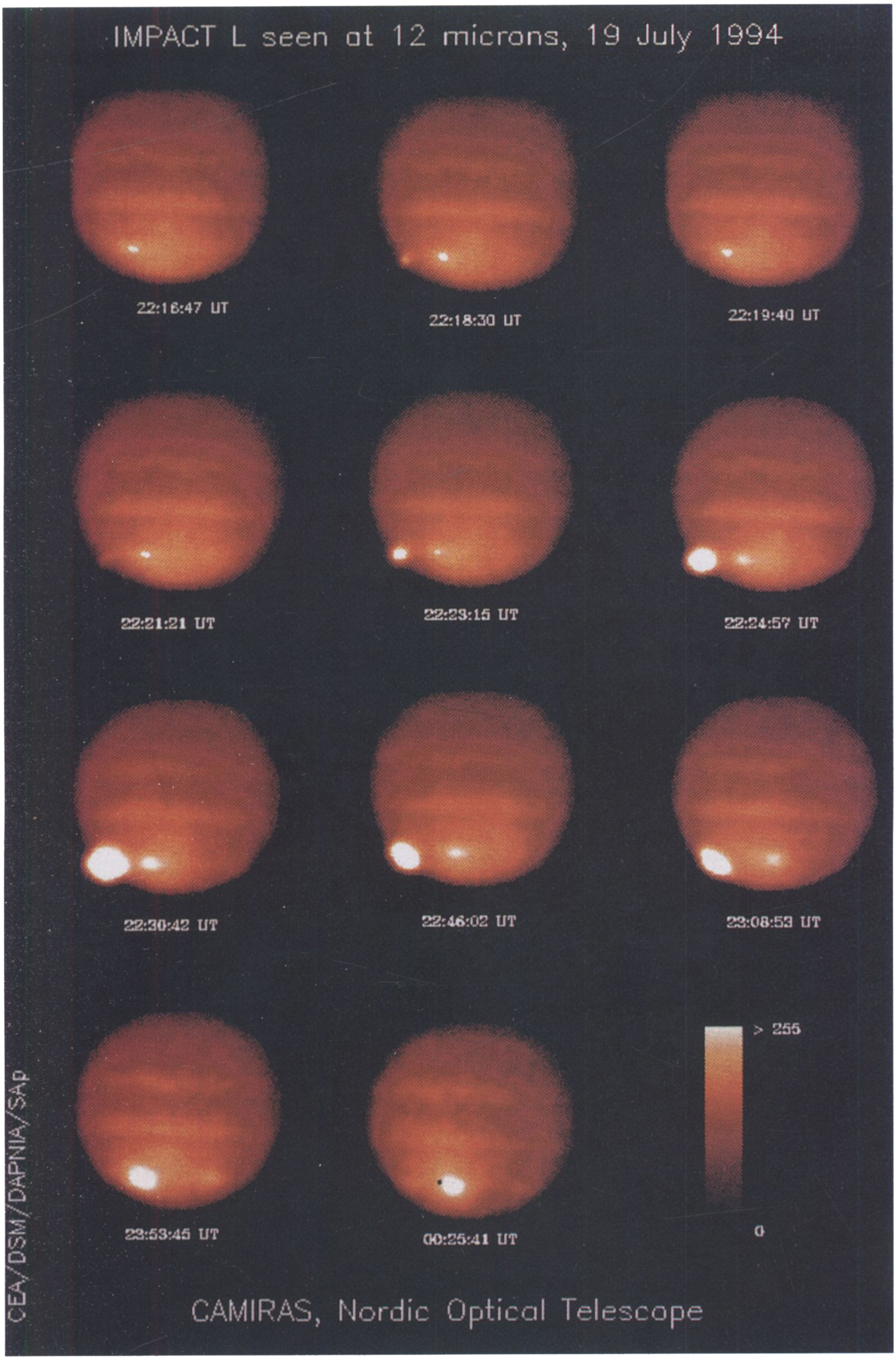
Because of favourable weather conditions, the majority of the results during the impact week came from the Nordic Optical Telescope. These results were obtained with the Saclay CAMIRAS camera equipped with a 64*64 Si:Ga/DVR detector array developped at LETI/LIR (CEN Grenoble). A broad- band filter centered at 11.9 microns was used; the pixel field of view was 0.8 arcsec; an image was stored every second. Ten impacts were observed. A bright IR spot was observed after impacts A, E, H, L, Q1, whereas impacts F, Q2, P2, T and U were not detected.

First general conclusions are thus: i) the comet did not break up before collision, as predicted before impact. ii) there is no correlation between the optical brightness of the fragments before impact and the IR spot seen after the impact. Afterall this is not surprising, considering that the IR signal is mainly related to the most solid parts of each fragment, whereas the optical brightness before impact was due to the dust surrounding the core.

The observations also allow to test, under unprecedented physical conditions, the models describing the interaction of a bolide entering the atmosphere. Of particular interest was the observation of the brightest impact, the L impact. Fig. 1 features the temporal evolution of the IR spot following the impact: i) A precursor flash was first seen during about one minute around 22h 18min 30s. The flash was seen 1min 45s min after detection by the Galileo spacecraft and 30 s after detection at 2 microns. One interpretation is that we are looking at the debris cloud rising above the limb of Jupiter (that means more than 400 km), as sometimes predicted. ii) Twelve minutes later, a huge IR spot at a temperature of 700K was seen at its paroxism: 18 000 Jy. iii) Later on, the spot was spatially resolved, as indicated by its elliptical shape. The deconvolved image has shown a spot extension up to 30 000 km. iv) On the last image, the dark point indicates the impact site position. The IR spot is found to be decentered by 11 degrees.

The last point gives support to the models explaining the bright IR spot in terms of gaz-dust ballistic re-entry in the atmosphere. A velocity of the ejecta of 16 km/s is needed to explain the decentering. Such a velocity implies a re-entry time 14 min after impact, in good agreement with the observations, and an elevation of the ejecta of 2500km, well above the limb.

Fig.1: Temporal evolution of the mid-IR signal seen after the L impact with the CAMIRAS 10 micron camera mounted on the Nordic Optical Telescope. The bright spot on the first image is the remnant of a previous impact: impact K. A precursor flash from impact L is visible at 22h 18 min 30s, followed by the main IR spot at maximum around 22h 31min. At that time the spot was one of the brightest IR sources in the sky. Then the spot was spatially resolved as indicated by its elliptical shape; an extention of 30 000km in diameter was measured. On the last image, the blue point indicating the nominal position of the impact shows that the IR spot is decentered, favouring an interpretation of this IR spot in terms of ejecta re-entry into the atmosphere.



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