

Infrared Detection of an Impact on Jupiter by the R fragment of P/Shoemaker-Levy 9

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We have detected an impact brightening in IR images of Jupiter due to the explosion of the R fragment of P/Shoemaker-Levy 9 in Jupiter's atmosphere. Observations were made on a 2.7m telescope using a NICMOS array (Rokcam) at McDonald Observatory, Texas, U.S.A. during the weeks of the comet impacts, and about one week after the last impact. The detection of the impact brightening was made with a 2.12 micron filter to isolate the H₂ S(0) pressure induced dipole absorption. The brightening started at 05:41 (UT), on July 21, 1994, about 12 minute later than the predicted impact time of the fragment R (Chodas & Yoemans's prediction made on July 20, 1994), and lasted about 10 minutes. Our data show that the flash increased by a factor of 2 in consecutive images taken 18 seconds apart, and saturated the detector at its peak brightness. About 6 minutes before this flash, there was a hint of a small brightness increase in the same area. We compared our 2.12 images with near IR (8900 Å) images obtained by other groups, and found the explosion that we observed was hot to produce thermal infrared radiation at 2.12 micron, but not hot enough to produce any significant brightening in the near IR images. We will discuss implications of both the main flash and the preceding one in terms of dynamical processes involving the comet fragment's entry into Jupiter's atmosphere.