

GALILEO NIMS DIRECT OBSERVATIONS OF THE SL-9 FIREBALLS

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The Galileo spacecraft was situated 1.8 AU from Jupiter, at a phase angle of 51 deg, providing a direct view of the impacts of the comet fragments with the planet. Low resolution infrared spectra in the 1 to 5 micron range were recorded for several of the events, which can be used to study the early evolution of the fireballs. Preliminary analysis of the data received for the G event shows an initial fireball temperature of greater than 5000 K and an effective source diameter of less than 10 km. These spectra show absorption by molecular hydrogen and methane which place the upper emitting surface in the stratosphere, above the ammonia cloud level. As time progresses, the fireball cools and the effective diameter of the radiating area increases at roughly 2 km/sec. In 30 seconds, the fireball cools to approximately 1000 K and exhibits a diameter of about 100 km. The strength of the hydrogen and methane absorption decreases with time, indicating that the upper surface is rising, due to expansion and buoyancy. The fireball appears to expand adiabatically, with a ratio of specific heats of 1.2. After about 30 seconds, the data indicate a multiple temperature (or opacity) structure, with the hotter component emitting in wavelength bands suggestive of hot water vapor. These data, as well as additional data extending the time development of the G and R events will be presented.

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2.. PS9 (Comets: from Shoemaker)

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