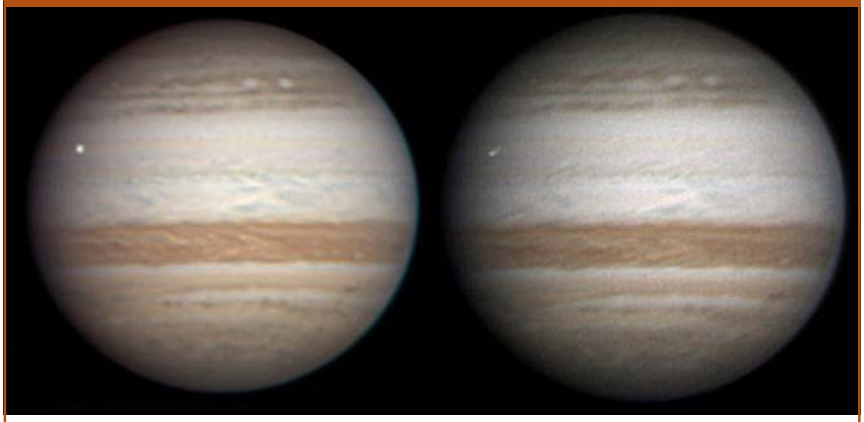
Jupiter Section

New fireball impacts seen on Jupiter



On 2010 June 3, Anthony Wesley in Australia discovered another impact on Jupiter. This time he observed the bright fireball live on screen while recording a webcam video, and Chris Go in the Philippines also captured it on his video simultaneously. This was the first fireball ever recorded on another planet by Earth-based observers. Wesley's video was in red light and the fireball lasted 2.6 secs. Go's video was in blue light and the fireball lasted 0.8 secs.

The fireball occurred at 20:31.5 UTC, towards the evening limb of the planet. Within hours, observers were alerted by e-mail, and western European observers (including British visual observers) watched in the dawn as the impact site rotated round onto the visible side of the planet again. However, there was no dark spot. The absence of any trace was confirmed by Tomio Akutsu with higher resolution on June 5, and by the Hubble Space Telescope on June 7.

The absence of a 'scar' should not be surprising. Evidently this was a 'small' impact, similar to the smallest fragments of Comet Shoemaker–Levy 9 in 1994. The direct imaging of the SL9 impacts by the *Galileo* spacecraft[1] showed a bright flash a few seconds long like this one even for a small fragment which produced virtually no scar (fragment N). A small impactor can explode high in the atmosphere, where it is not dense enough to produce the carbonaceous black 'smoke' that marks larger impact sites.

So, impacts like this could be frequent, but never before recorded, and still consistent with the rarity of larger impacts that leave obvious traces. Such fireballs may be frequent enough that systematic monitoring of amateur videos could detect more of them and measure their frequency.

A similar bright fireball on Jupiter was in fact imaged on 2010 August 20 by Masayuki Tachikawa and independently by two other Japanese observers. Again it left no mark. Amateur webcam imaging can now begin to measure the frequency of these 'small' impacts.

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1 Chapman *et al.*, *Geophys.Res.Lett.*, **22**(12), 1561 (1995)