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The solar wind interaction with Comet Machholz (C/2004 Q2) as revealed by amateur images.

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Abstract

A relatively bright comet (Magnitude ~3.5), Comet Machholz proved to be an ideal probe of the solar wind due to a fortunate alignment with the Sun-Earth line. The perihelion of comet Machholz was within 0.2-0.3 Astronomical Units of Earth's position in January 2005. This geometry provided a unique opportunity to reliably map near-Earth solar wind conditions out to the comet. The plasma tail generally points away from the Sun. Any deviations or unusual features can generally be directly related to changes in the localised solar wind, e.g. tail disconnections are often linked to heliospheric current sheet crossings.

We studied amateur images of the comet's plasma tail and compared these with near-Earth solar wind data and other heliospheric observations to establish links between solar wind variations and comet tail features. The comet interacted with several coronal mass ejecta within the period of observation. We summarise the results of the study.

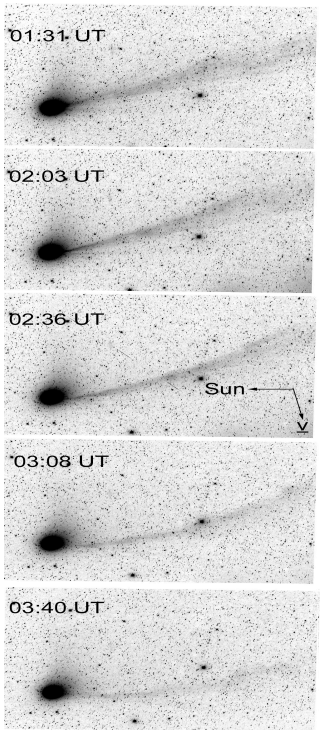

Figure 1: Image by Walter Koprolin (18/01/2005). The figure shows rapid changes in the plasma tail.