

ACTIVITY AND DEVELOPMENT OF THE
GEMINID/SEXTANTID METEOR STREAM COMPLEX

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Based on their orbital elements and similarities in activity, the origins of the December night-time Geminid and September day-time Sextantid meteor streams are believed to be related to the asteroid 3200 Phaethon which in turn is believed to be the remnants of a small comet.

In this presentation, the orbital evolution of Phaethon is studied by numerically integrating its equations of motion into the past. Using a symplectic integrator that can handle close encounters with planets correctly and a suite of clones, the past behaviour of Phaethon can be investigated to the limits that current knowledge of its orbit and the obscuring effects of chaos allow. From this, changes in the orbital elements of the parent body, and in particular potential intersections of its orbit with that of the Earth, can be investigated.

The activity of the two meteor showers has been monitored in recent years using the Canadian Meteor Orbit Radar (CMOR) located at a site near London, Ontario. This system is capable of locating accurately the position in space of a given meteor, and from an accumulation of such measurements a statistical estimate of the shower radiant is accessible. Recent addition of two outlying stations allows a good estimate of the orbital elements of the individual meteors that are observed on all three stations, about 25 percent of the total meteors seen at the main site. Using this system, the activity of the two showers in recent times is investigated and evidence is presented showing similarities in the behaviour of the two streams consistent with a common origin from Phaethon.

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