

New Martian Trojans and an update on the Eureka cluster

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Abstract

The number of known Trojan asteroids of Mars has recently increased twofold [1, 2]. This has led to claims of a cluster [2] associated with the first Mars Trojan discovered, 5261 Eureka.

The existence of an asteroid family so close to the Sun has implications for our understanding of asteroid evolution in general. Depending on the formation mechanism, studying these objects will provide insight on their collisional history and their long-term physical & dynamical evolution under the Yarkovsky and YORP effects [3]. Martian Trojans are also a useful control population for the study of the resetting of asteroid surfaces by planetary close encounters [4].

The clustering claim is based on an overall sample of 6 Trojans. To confirm it, we are presently carrying out an observational programme to (a) recover single-opposition Martian Trojan candidates and increase the sample size, and (b) improve the orbits of known Trojans. At the time of abstract submission, we have con-

firmed several additional asteroids as Martian Trojans, including a single-opposition object - 2011 SL₂₅ - recovered early in 2014 using the 2.5m Isaac Newton Telescope (Isaac Newton Group, La Palma, Canary Islands; Fig. 1). We have also recovered 2011 UN₆₃ using the 2m Faulkes Telescope South (Siding Spring, Australia), a confirmed cluster member that was nevertheless previously observed on only two apparitions.

During the conference, we will present results for the additional objects, in particular whether they are cluster members or not. Using the improved statistics and orbits, we re-assess the different scenarios for the cluster's origin.

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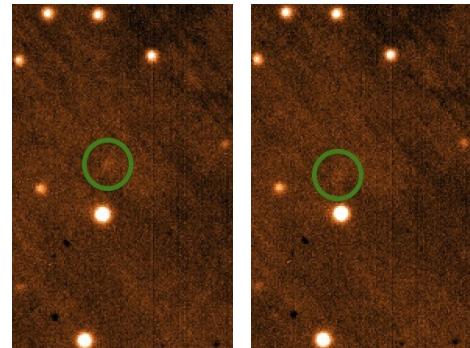


Figure 1: Crops of two 2011 SL₂₅ recovery frames taken at 20:12:54 and 20:15:41 UT on 26 Jan, 2014 showing the motion of the asteroid (green circle). The fields shown are approximately 1.5×2.5 arcmin across.

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