

CLASSICAL KUIPER BELT: MODELING THE COLOR-INCLINATION TREND. N. Peixinho^{1,2,3}, P. Lacerda¹, and D. Jewitt¹, ¹Institute for Astronomy, University of Hawaii, USA (peixinho@ifa.hawaii.edu), ²Center for Computational Physics, University of Coimbra, Portugal, ³Astronomical Observatory of the University of Coimbra, Portugal.

Introduction: Classical Kuiper Belt Objects (CKBOs) are the only dynamical family of Kuiper Belt bodies for which strong trends between surface colors and orbital parameters have been detected [1,2]. It is generally believed that CKBOs consist of a superposition of two physically and dynamically distinct populations [3]. Hence, those color trends are often discussed from that perspective: either in the context of surface evolution mechanisms or in the context of dynamical evolution mechanisms. In this work we reanalyze the correlation between colors and inclinations of CKBOs using a larger sample of high quality measurements.

Data Analysis: (1) We have analyzed how the color-inclination correlation behaves when the data set is consecutively truncated at different inclination values. (2) When truncating the sample we have measured how different are the colors of the higher inclined objects from the lower inclined ones. (3) Following the results of the two previous steps, we chose several simple plausible functional forms that could model the color-inclination trend and looked for the best fitting equation.

Results and Discussion: The analysis shows that this color-inclination correlation is most compatible with a non-linear and stepwise behavior in which objects below $\sim 12^\circ$ of orbital inclination appear as homogeneously red, whereas colors of objects above $\sim 12^\circ$ of inclination do seem to vary with inclination (see Figure 1). These two differently behaved groups of CKBOs may also overlap at some inclination range, but we cannot favor it statistically relatively to the previous case.

Previous works suggested a direct equivalence between CKBOs with inclinations lower than $\sim 5^\circ$, usually called dynamically cold CKBOs, and the cluster of red objects seen at low inclinations [4,5]. As our work indicates that CKBOs are homogeneously red up to $\sim 12^\circ$ of inclination this equivalence cannot be established. Other possibilities need to be discussed.

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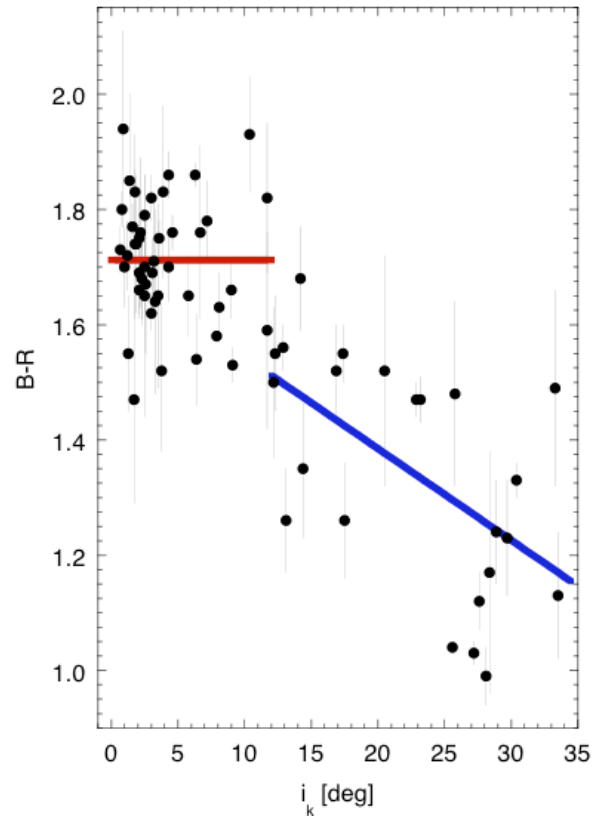


Figure 1: B-R colors versus inclination of our 69 CKBOs. The best fitting stepwise function is drawn.

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