

Continuing the Search for Main Belt Comets with the CFHT Legacy Survey. A. Moldowan¹ and P. Wiegert^{1,2},
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Introduction: Asteroids and comets have very different distributions within our Solar System. However, they almost certainly form a continuum, with compositions from the very rocky to the very icy.

Curiously, transitional objects (those which are not easily classified as one or the other) are rare and the link between the two primeval populations has received very little attention. However, three transitional objects, or Main Belt Comets (MBC), have already been found [1] and there are likely many more.

Data and Analysis: To address this, we are searching for MBCs by making use of the enormous data set acquired by the Canada-France-Hawaii Telescope Legacy Survey (CFHTLS). Wiegert et al. [2] have used the CFHTLS data from MegaPrime to find over 1500 asteroids in the Main-Belt.

By studying the profiles of these objects and comparing them to profiles of nearby stellar sources with similar magnitudes, we can determine whether an object shows evidence of gas or dust production, indicating cometary activity.

An example. Comet 166P (NEAT) was found in the CFHTLS observations. We compare its profile to that of three nearby stellar sources with similar magnitudes by plotting the scaled pixel variations over the width of the objects (Figure 1). The curve for 166P shows extended wings. We believe this non-Gaussian fit is indicative of cometary activity.

Results: We have begun preliminary analysis to select the best MBC candidates. We have found a small number of objects that show hints of cometary activity, but few, if any, with distinct characteristics like comae or tails. The results of this portion of the study will be presented.

References: [1] Hsieh, H. and Jewitt, D. (2006) *Science*, 312, 561. [2] Wiegert, P., Balam, D. and Moss, A. (2007) *AJ*, 133, 1609.

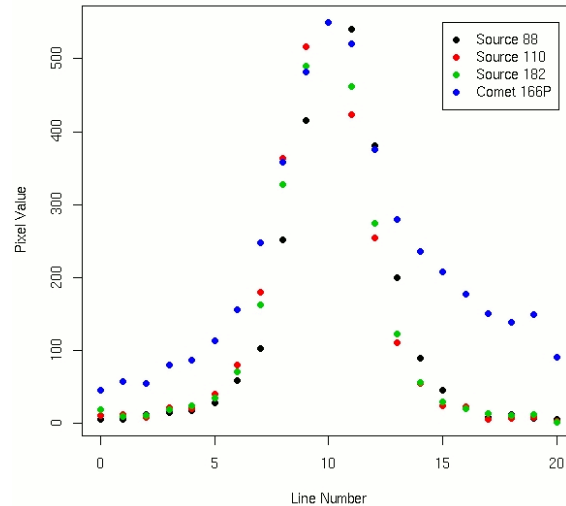


Figure 1: Profiles of 166P and 3 comparison stars.