[ID-15] A New Calibration of Deep MMT 6.5m Transit Survey Data for Variability Research

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Increasing number of wide-field optical surveys are being conducted for studies of interesting variability such as exoplanet transits and transients. The deep time-series imaging observation by the MMT 6.5m transit survey program did not reveal any transiting planets, but it does provide a rare opportunity to explore optical variability at relatively high temporal resolution (30s ~ 90s). This is the primary goal of our present research project; i.e. the detection of fast and unusual variables. We find however that the light curve archive from the original image subtraction procedure exhibits many unusual outliers, and more than 20% of data get rejected by a simple filtering algorithm. In order to achieve much more accurate photometric precisions and also to make the most efficient use of the data, we are re-processing the entire image database with multi-aperture photometry and carefully tuned calibration procedures. We also added a new index that isolates peculiar situations where photometry returns misleading information. In this presentation, we demonstrate the improvement of data statistics and accuracy as well as potentials for the detection of micro-variability and extremely temporal variability.