

[ID03] High Speed Aperture Photometry for KBO Occultation Detection

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The Taiwan-America Occultation Survey (TAOS) aims to find small sized, diameters of a few km, Kuiper Belt Objects (KBO) to estimate their number density and size distribution. TAOS uses four 50cm telescopes equipped with 2K CCDs and searches for stellar occultation events caused by KBOs by means of very fast wide-field photometry of 4 or 5 Hz and of 3 deg². This high time resolution is currently achieved by shifting CCD charges repeatedly during an exposure; the resulting image is called a zipper image where all stars repeat themselves at a regular interval. In this presentation, we will describe the part of our data reduction methods which deal with three major obstacles in obtaining high quality light curves with minimum false positives from our zipper images.

[ID04] Development of Breadboard AmonRa Optical System
for Deep Space Albedo Measurement

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For last three years, we have developed a novel space key instrument for deep space albedo measurement, called AmonRa. As the main optical payload in EARTHSHINE satellite, it was designed to find the key reasons for the global Earth climate change and integration mechanism between the Sun and Earth. Although it consists of an imager channel and an energy channel, we discuss the development of the imager channel especially here. We present measurement techniques and designed optical solution of AmonRa satisfying its science requirements. Methodologies of fabrication, integration and alignment are also discussed. The optical system performance is analyzed into ideal design and simulated design with measured optical surfaces. These are compared with performance from integrated system. For more precise performance test, we apply off-axis test beam from phase shifting interferometer. Based on these analyses, the optical performance of the AmonRa breadboard optical system (designed, fabricated, aligned and tested in house) satisfies the science requirements in full.