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THE PAN-STARRS SEARCH FOR NEAR EARTH OBJECTS

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ABSTRACT

The two Pan-STARRS telescopes, located on Haleakala, Maui, Hawaii, are 1.8-meter diameter telescopes equipped with 1.4 Gigapixel cameras that deliver 7 square degree fields of view. The first of these telescopes, Pan-STARRS1 (PS1), is now conducting a dedicated survey for Near-Earth Objects. The second telescope, Pan-STARRS2 (PS2) is being commissioned. It will initially supplement the PS1 search by targeting Near Earth Objects (NEO) candidates from PS1. As its efficiency grows, PS2 also will search for NEOs, and will increase the sky coverage and cadence.

PS1 is cooperating with the G96 telescope of the Catalina Sky Survey in terms of field selection. Between declinations of -30 and $+30$ degrees, the telescopes alternate 1 hour-wide RA stripes each night. This strategy has led to increased productivity, and eliminated accidental repeats of fields. The PS1 survey area has been extended south to -47.5 degrees declination. The image quality in the deep southern sky from Haleakala is good, and the new southern extension to the survey area has been very productive.

PS1 discovered more than half of the larger NEOs and PHAs in 2014, and has become the leading NEO discovery telescope. PS1 delivers excellent astrometry and photometry. PS1 continues to discover a significant number of large (> 1 km) NEOs.

The Pan-STARRS telescopes are very efficient at detecting cometary activity. PS1 discovered almost half of the new comets in 2014, and discovered 10 comets in 10

nights in November 2014.

The present discovery rate of NEO candidates by PS1 is now overwhelming the external NEO follow-up resources, particularly for fainter NEOs. It has required that PS1 repeat fields to recover NEO candidates. As PS2 matures, and when G96 has its new camera, the combination of these three telescopes will facilitate a higher NEO discovery rate, and a better census of the NEOs in the sky. This will in turn lead to a better understanding of the size and orbit distribution of NEOs, and the corresponding hazard to Earth. The Pan-STARRS NEO survey is also likely to discover asteroids suitable for the NASA asteroid redirect mission.
