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Near-Earth Object (NEO) Discovery
NEO Characterization

The Discovery and Observation of Comets by NEO Surveys

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ABSTRACT

Prior to the 1990s, comets were generally discovered either in large photographic plate exposures or by individuals who visually scanned the sky, often employing specialized telescopes or binoculars with fast optics. With the advent of the earliest digital sky surveys, the automated surveys began to make significant contributions in the number of comet discoveries in the mid-1990s. The efforts to detect solar system objects have been largely driven by the intent to discover and characterize Near Earth

Objects (NEOs), and have been remarkably effective. As a means of discovering comets, the NEO search programs have also been effective, not only regarding the comets that are a component of the NEO population, but also considering the discovery of more distant comets. More than 4400 comets have been discovered as of December 1, 2022 according to the Minor Planet Center. Along with a marked increase in the number of comet discoveries brought through ground-based surveys, the number of observations of comets has increased as well. These data include valuable survey observations from specialized space-based platforms that have unique characterization capabilities, like the Solar and Heliospheric Observatory (SOHO) and NEO Wide-field Infrared Survey Explorer (NEOWISE).

We summarize the number of cometary discoveries and observations provided by surveys. The proportionally greater number of discoveries of comets made by surveys, particularly those that actively search for NEOs, have yielded in turn larger samples of cometary populations and sub-populations for study, resulting in better defined evolutionary trends. We will also discuss how future ground- and space-based surveys, like the NEO Surveyor mission and Rubin Observatory, can improve our population-wide picture of cometary properties.

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