Kiso Outer Solar System Survey

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We are now carrying out a near ecliptic wide field survey of large
EKBO using 1.05-m Schmidt telescope with 2K CCD camera at the Kiso
Observatory, the Institute of Astronomy, University of Tokyo. Purpose
of this survey is to estimate accurately the surface density of bright
EKBO which is still uncertain. We have surveyed 20.5 $\text{sr} \text{deg}^{-2}$ of
the region so far, and detected no EKBO. The upper limit of the
cumulative surface density of EKBO brighter than 21.0 magnitude
derived by our survey is $2.2 \times 10^{-1} \text{deg}^{-2}$. We will
report the preliminary result of our survey.

Since the discovery of $\text{1992 QB}_1$, more than 200 Edgeworth-Kuiper
Belt Objects (hereafter, EKBO) have been detected in the region beyond
the orbit of Neptune. These objects are thought to be remnants of the
planetesimals that didn't form a giant planets. EKBOs are the objects
least thermally affected by the radiation of the Sun for their large
heliocentric distance. It is important to know the basic properties of
these primordial bodies to understand the origin and evolution of the
solar system, such as size distribution, spatial distribution and
physical properties of the surface material. The size distribution of
EKBO is important that it reflects on the collisional history of EKBOs
themselves. It also provide important information for determining the
tensile strength of EKBO and initial condition of the size
distribution. We are now carrying out a near ecliptic wide field
survey of large EKBO using 1.05-m Schmidt telescope with 2K CCD camera
at the Kiso Observatory, the Institute of Astronomy, University of
Tokyo. Purpose of this survey is to estimate accurately the surface
density of bright EKBO which is still uncertain, and determine the
whole range of the size distribution. We have surveyed 20.5 $\text{sr} \text{deg}^{-2}$ of
the region so far, and detected no EKBO. The upper limit of the
cumulative surface density of EKBO brighter than 21.0 magnitude
derived by our survey is $2.2 \times 10^{-1} \text{deg}^{-2}$. Although
the upper limit of the surface density put no restriction on the size
distribution of EKBO, we will continue our survey. We assumed the size
distribution of EKBO is expressed as a differential power-law, and
performed the Monte Carlo simulation. When the size distribution of
EKBO is written as $n(r) \text{dr} = \Gamma r^{-q} \text{dr}$, the index of the
power-law $q$ have to be $3.0 < q \leq 3.5$ to satisfy the previous
survey results. Here, $n(r) \text{dr}$ is the number of objects with size in
the range $r$ to $r + dr$. We will report the preliminary result of
our survey.