Session:	**[B5B-1] S1 : Solar System and Sun-Earth Interactions**
Date:	August 22, 2014 (Friday)
Time:	11:00~12:30
Room:	Room A (Room 101~102)
Chair:	Yongha Kim (Chungnam National University)

[B5B-1-1] **11:00~11:15**

The Pan-STARRS-1 Outer Solar System Key Project: A Status Report

Hsing Wen Lin (National Central University, Taiwan), Matthew Holman, and Ying Tung Chen

The Pan-STARRS-1 (PS1) survey is capable of detecting slow-moving objects in the outer solar system. Among these are Trojans, Centaurs, long-period comets, short-period comets, and trans-neptunian objects brighter than magnitude R~22. We have developed a software pipeline to search for these objects. I will present a status report for this pipeline, as well highlights from the PS1 Outer Solar System Key Project.

[B5B-1-2] **11:15~11:30**

A New Theory of the Formation and Evolution of the Solar System and the Expansion of the Universe as well as the Cause and Strategy of Global Climate Change

Cuixiang Zhong (Jiangxi Normal University, China)

Since the existing hypotheses for the Solar System formation have many problems with them, the author of this paper proposed a new theory to explain the formation and evolution of the Solar System and all other star systems in the Universe. Since the Sun revolves around the centre of the Milky Way Galaxy, it must have been a satellite produced by a fixed star, just like the Moon. The growth of the Sun has gone through several phases. When the proto-sun became an Earth-sized planet, it was able to produce massive volcanic eruption to form natural satellites, these satellites unceasingly incorporated the gas and dust near the orbit to became larger and larger, farther and father away from the Sun, forming some planets around the Sun. When some planets grew large enough to produce massive volcanic eruptions to form natural satellites, some natural satellites like the Moon revolving around the Earth and Io revolving around Jupiter were formed.

When the Sun grew into a proto-star much larger than Jupiter, the pressure and density of hydrogen in the centre of the proto-star became great enough for it to begin thermonuclear fusion. When the proto-star collided with another giant celestial body near the orbit or a massive volcanic eruption occurred on the proto-star, it initiated the thermonuclear fusion on the proto-star. Since the Sun's gravitational force is great enough to attract the needed amount of hydrogen to maintain the constant combustion, the Sun became a main-sequence star. The planets of the Solar system have been formed as the children of the Sun. Hence, the kinship among the stars in the Solar System presents a tree structure, so do the stars in the Milky Way Galaxy. Since the stars are formed from generation to generation, and their running spaces are extended unlimitedly, it shows the expansion of the Universe.

About Sun-Earth Interactions, the author found that volcanic eruptions at a certain scale on some planets can indeed cause the planets' orbital variation, thus moving the planets away from or closing to the Sun, that is why many planets are far from the Sun. Especially on the Earth, the orbital variation of the Earth can cause global warming or cooling, even making the Earth enter an interglacial period or a glacial period. Hence, the author's theory has solved the cause-problem of global warming as well as the cause-problem of the alternation of glacial and interglacial periods, and also found the corresponding strategies.

[B5B-1-3] **11:30~11:45**

Orbital Energy during Orbital Dynamics of Asteroid 4179 Toutatis

Endang Soegiartini (Institut Teknologi Bandung, Indonesia)

In our previous work, we investigated Asteroid 1934 CT or 1989 AC or 4179 Toutatis orbital dynamic from epoch 2012-Jul-24 (JDE2456132.5) using Mercury program package. Asteroid 4179 Toutatis is an Earth and Mars crosser orbit with semimajor axis $\boldsymbol{a = 2.5292\ au}$ and eccentricity $\boldsymbol{e = 0.6294}$. Its perihelion is $\boldsymbol{q = 0.9373\ au}$ and aphelion is $\boldsymbol{Q = 4.1211\ au}$. After 300.000 years, asteroid 4179 Toutatis will be escaped from the Solar System, but during this time, it will have close-encountered with other planets from Earth to Uranus. As continuation of this project, we investigated its energy and orbital angular momentum changes in each close encounter. We also check the energy and orbital angular momentum of this asteroid when it escaped from the Solar System. The result is, during its orbital evolution, we found out that the energy of this asteroid usually changes and gave us negative, zero or positive.

[B5B-1-4] **11:45~12:00**

Polarimetric and Morphological Imaging Analysis of Comets

Sonam Arora (Physical Research Laboratory, India) and Shashikiran Ganesh

Comets are relatively small icy bodies, often only a few kilometers in extent, that are formed in the outer solar system where temperatures are cold enough to sustain (predominately water) ices.One of the main objective behind the study of comets is to understand the origin of the Solar system. Since comets spend substantial part of their life away from the Sun, their subsurface material is considered pristine. Therefore, study of comets has proved very useful in our understanding of the origin of the solar system. We will present the detailed imaging, polarimetry and polarimetric imaging observations, data analysis techniques and interpretation of Comets C/2012 S1 (ISON) and C/2013 R1(Lovejoy) carried out from 1.2m and 0.5m telescopes installed at Gurushikhar Observatory, Mt.Abu, India. Imaging polarimetry allows us to investigate the small scale in-homogeneities in the near nucleus region of the cometary coma. We have long period imaging and these data has been used to estimate the opacity (and also the irregularities) of the cometary coma by measuring the photometric variations in the background stars as the comet passed over them.
From our preliminary analysis of the comet C/2012 S1(ISON) data taken in B, V and R bands and applying Larson Sekanina Algorithms on them, we have concluded that the jet features were more prominent in R band as compared to the features in shorter wavelength bands, suggesting that the comet would have lost large amount of dust during the outburst. Hence, it may be categorized into the class of dust rich comets.

Poster Session **12:00~12:30**

Chairs: **Yongha Kim** (Chungnam National University)

Shuhrat Ehgamberdiev (Ulugh Beg Astronomical Institute)