K-DRIFT and what we can learn from the K-DRIFT observations.

### [구 KDC-07] A novel simulation technique invented for studying low-surface brightness features in and around galaxies: Galaxy Replacement Technique (GRT)

Jihye Shin[1], Kyungwon Chun[1], Rory Smith[1,2], Jongwan Ko[1,2]
*[1]Korea Astronomy and Space Science Institute (KASI)*
*[2]University of Science Technology (UST)*

K-SIM (KASI-Simulation) research project is dedicated to develop new numerical techniques in order to theoretically study galaxy formation and evolution. As the first step of the K-SIM, to model tidal stripping of galaxies with a very high resolution in a fully cosmological context, we invented the Galaxy Replacement Technique (GRT) that is very efficient and fast. The high resolution allows us to accurately resolve the tidal stripping process and well describe the formation of ultra-low surface brightness features in the galaxy cluster (μV < 32 mag/arcsec^2), such as the intra-cluster light, shells and tidal streams. I'll introduce how the GRT is designed and which science topics in low-surface brightness regime can be visited using the GRT.

## [특별세션] Rendezvous Mission to Apophis

### [구 RMA-01] Rendezvous Mission to Apophis: I. Mission Overview

Young-Jun Choi[1,2] on behalf of the RMA Team
*[1]Korea Astronomy and Space Science Institute,*
*[2]University of Science and Technology*

An asteroid is important for understanding the condition of our solar system in early-stage because an asteroid, considered as a building block of the solar system, preserves the information when our solar system was formed. It has been continuously flowing into the near-Earth space, and then some asteroids have a probability of impacting Earth. Some asteroids have valuable minerals and volatiles for future resources in space activity.

Korean government clarified, in the 3rd promotion plan for space activity, an asteroid sample return mission by the mid-2030s. However, it is almost impossible to do so based on only a single experience of an exploration mission to the Moon, Korea Pathfinder Lunar Orbiter, which will be launched in mid-2022. We propose a Rendezvous Mission to Apophis(RMA), beneficial in terms of science, impact hazardous, resource, and technical readiness for the space exploration of Korea.

### [구 RMA-02] Rendezvous Mission to Apophis: II. Science Goals

Myung-Jin Kim[1], Hong-Kyu Moon[1], Young-Jun Choi1[2], Minsup Jeong[1], Masateru Ishiguro[3], Youngmin JeongAhn[1], Hee-Jae Lee[1], Hongu Yang[1], Seul-Min Baek[1], Jin Choi[1], Chae Kyung Sim[1], Dukhang Lee[1], Dong-Heun Kim[1,4], Eunjin Cho[1,2], Mingyeong Lee[1,2], Yoonsoo Bach[3], Sunho Jin[3], Jooyeon Geem[3], Hangbin Jo[3], Sangho Choi[5], Yaeji Kim[6], Yoonyoung Kim[7], Yuna Kwon[7]
*[1]Korea Astronomy and Space Science Institute, [2]Univ of Science and Technology, [3]Seoul National Univ, [4]Chungbuk National Univ, [5]Yonsei Univ, [6]Auburn Univ, USA, [7]Technical Univ of Braunschweig, Germany*

99942 Apophis is an Sq-type Potentially Hazardous Asteroid (PHA) with an estimated diameter of 370 m. It will approach the Earth down to 31,000 km from the surface during the encounter on April 13, 2029 UT, which is closer than geostationary satellites. This once-in-a-20,000 year opportunity would further expand our knowledge on the physical and dynamical processes which are expected to occur due to the gravitational tidal forces when an asteroid encounter with a planet. It will also provide an opportunity to promote great knowledge of the science of planetary defense. The science goal of the Apophis mission is to global-map the asteroid before and after the Earth's approach. In this talk, we will present scientific objectives, and briefly introduce instruments and operation scenarios of the mission.

### [구 RMA-03] Rendezvous Mission to Apophis: III. Polarimetry of S-type: For A Better Understanding of Surficial Evolution

Jooyeon Geem[1](김주연), Minsup Jeong[2](정민섭), Sunho Jin[1](진선호), Chae Kyung Sim[2](심채경), Yoonsoo P. Bach[1](박윤수), Masateru Ishiguro[1], Yuna G. Kwon[3](권유나), Hong-Kyu Moon[2](문홍규), Young-Jun Choi[2](최영준), Myung-Jin Kim[2](김명진)
*[1]Seoul National University (서울대학교), [2]Korea Astronomy and Space Science Institute (한국천문연구원), [3]Technische Universität Braunschweig*