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We aim to investigate inflow history of matters that fall into the satellite systems around a dwarf galaxy in Lambda-Cold Dark Matter model. Each satellite system has unique properties because all satellite systems have different mass inflow history by environments and/or the events such as cosmic reionization and merging with other halos. To trace mass inflow history of the satellite systems, we perform three different cosmological zoom simulations whose galaxy mass is ~$10^{10}M_{sun}$. Each initial zoom simulation covers a cubic box of $1Mpc/h^3$ with 17 million particles. Particle mass for dark matter (DM) and gas components is M_{DM} = 4.1×10^3 M_{sun} and M_{gas} = 7.9×10^2 M_{sun}, respectively. Thus, each satellite system is resolved with more than hundreds – thousands of particles. We analyze the influence of the gravitational interaction with host galaxy, baryonic matter inflow by various cooling mechanisms, and merging events with other halos on the mass inflow history of satellite systems.

[포 GC-15] The evolution of a late-type galaxy in a Coma-like cluster

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We study the evolution of a late-type galaxy (LTG) in a rich cluster environment by using N-body/SPH simulations. To do that we perform a set of simulations of a LTG falling in a Coma-like cluster and also the LTG colliding with early-type galaxies (ETGs) multiple times in the cluster environment. We use a catalog of the Coma cluster in order to estimate the typical number of collisions and the closest approach distances that a LTG would experience in the cluster. We investigate the cold gas depletion and star formation quenching of our LTG model influenced by the hot cluster gas as well as the hot halo gas of the colliding ETGs.

[포 GC-16] Intra-night optical variability of AGN in COSMOS field.

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Optical variability is one way to probe the nature of the central engine of AGN at smaller linear scales and previous studies have shown that optical variability is more prevalent at longer timescales and at shorter wavelengths. Especially, intra-night variability can be explained through the damped random walk model but small samples and inhomogeneous data have made constraining this model hard. To understand the properties and physical mechanism of optical variability, we are performing the KMTNet Active Nuclei Variability Survey (KANVaS). Test data of KMTNet in the COSMOS field was obtained over 2 separate nights during 2015, in B, V, R, and I bands. Each night was composed of 5 and 9 epochs with ~30 min cadence. To find AGN in the COSMOS field, we applied multi-wavelength selection methods. Different selection methods means we are looking different region in unification model of AGN, and 100~120, 400~500, 50~100 number of AGN are detected in X-ray, mid-infrared, and radio selection of AGN, respectively. We performed image convolution to reflect seeing fluctuation, then differential photometry between the selected AGN and nearby stars to achieve photometric uncertainty ~0.01mag. We employed one of the standard time-series analysis tools to identify variable AGN, chi-square test. Preliminarily results indicate that intra-night variability is found for X-ray selected, Type1 AGN are 23.6%, 26.4%, 21.3% and 20.7% in the B, V, R, and I band, respectively. The majority of the identified variable AGN are classified as Type 1 AGN, with only a handful of Type 2 AGN showing evidence for variability. The work done so far confirms that there are type and wavelength dependence of intra-night optical variability of AGN.

천문우주 관측기술

[포 AT-01] The Flight Model of the NISS onboard NEXTSat-1

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The NISS (Near-infrared Imaging Spectrometer for Star formation history) is the near-infrared instrument optimized to the Next Generation of small satellite series (NEXTSat). The capability of both imaging and low spectral resolution spectroscopy in the near-infrared range is a unique function of the NISS. The major scientific mission is to study the cosmic star formation history in local and distant universe. For those purposes, the main observational targets are nearby galaxies, galaxy clusters, star-forming regions and low background regions.

The off-axis optical design is optimized to have a wide field of view (2 deg. x 2 deg.) as well as the wide wavelength range from 0.95 to 3.8μm. Two linear variable filters are used to realize the imaging spectroscopy with the spectral resolution of ~20. The mechanical structure is considered to endure the launching condition as well as the space environment. The compact dewar is confirmed to operate the infrared detector as well as filters at 80K stage. The electronics is tested to obtain and process the signal from infrared sensor and to communicate with the satellite.

After the test and calibration of the engineering qualification model (EQM), the flight model of the NSS is assembled and integrated into the satellite. To verify operations of the satellite in space, the space environment tests such as the vibration, shock and thermal-vacuum test were performed. Here, we report the test results of the flight model of the NISS.

[포 AT-02] Fabrication of Aluminum Parabolic Mirror (알루미늄 포물면 반사경의 제작)

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일반적으로 천체 망원경에 사용되는 반사경은 유리 소재로 제작된다. 그러나 알루미늄을 반사경 소재로 사용하면 광기계구조물과 반사경의 열팽창계수가 유사하여 치수 안정성이 높다는 장점이 있다. 뿐만 아니라 다이아몬드 선삭 기계 (Diamond Turning Machine, DTM)를 이용할 수 있기 때문에 반사경의 가공 시간 및 제작 비용을 절감할 수 있다. 본 연구에서는 알루미늄 합금 (Al6061-T6)을 소재로 구경 150 mm, 초점거리 600 mm인 포물면 반사경을 제작하였다. 우선 DTM을 이용해 알루미늄을 가공하였는데, 이 때 표면 조도와 관련된 고주파 오차 (High Frequency Error, HFE)가 발생한다. 따라서 표면 조도를 향상시키기 위한 추가적인 공정으로써 가공된 표면을 도금한 후 열처리를 하고, 폴리싱과 이중 코팅을 거쳐서 최종 반사경을 얻었다. 각 단계별 공정을 마친 후에는 접촉식 및 광학식 형상 측정 방법으로 표면 측정을 실시하여 이를 분석하였다. 본 발표에서는 각 공정 단계에서의 반사경 표면 분석 결과를 설명할 것이며, 제작된 알루미늄 반사경과 기존의 유리 소재의 반사경을 성능 면에서 비교할 것이다.

[포 AT-03] Recent sharing study results of ITU-R Study Group 7

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국제전기통신연합(ITU)는 지구상의 인류가 사용하는 전파의 공정한 사용과 국가별 분쟁조정을 위한 각종 회의를 주재하는 UN산하의 국제기관으로 현재 200 여 회원국이 참여하고 있다. 그리고 이를 위한 국제법 제정과 각종 연구결과와 기술문서 작성, 사전의견조율 등은 세계전파통신회의(WRC) 및 ITU산하의 관련 연구그룹(SG7)과 작업반(WP7D)에서 이루어진다. 따라서 기존에 제정된 ITU의 각종 기술문서(권고서, 보고서 등) 또는 의제 관련 연구결과를 WRC 의제 특성에 맞도록 결과를 도출하는 작업은 향후의 국제법 제정에 있어서 매우 중요한 변수로 작용한다.

이에 우리나라의 관련 주관청(미래부 전파정책국)에서는 매년 2회 개최되는 ITU-R 연구그룹회의에 정부 대표단을 파견하여, 과학업무(전파천문, 기상, 과학위성 등)와 관련된 기술문서 개정과 WRC의제 연구동향을 주시하면서 우리나라 이익과 관련된 사항에 대한 의견개진을 추진하고 있다.