

[구 GC-28] Beyond halo mass: the role of vorticity-rich filaments in quenching galaxy mass assembly

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We examine how the mass assembly of central galaxies depends on their location in the cosmic web. The HORIZON-AGN simulation is analysed at $z \sim 2$ using the DISPERSE code to extract multi-scale cosmic filaments. We find that the dependency of galaxy properties on large-scale environment is mostly inherited from the (large-scale) environmental dependency of their host halo mass. When adopting a residual analysis that removes the host halo mass effect, we detect a direct and non-negligible influence of cosmic filaments. Proximity to filaments enhances the build-up of stellar mass, a result in agreement with previous studies. However, our multi-scale analysis also reveals that, at the edge of filaments, star formation is suppressed. In addition, we find clues for compaction of the stellar distribution at close proximity to filaments. We suggest that gas transfer from the outside to the inside of the haloes (where galaxies reside) becomes less efficient closer to filaments, due to high angular momentum supply at the vorticity-rich edge of filaments. This quenching mechanism may partly explain the larger fraction of passive galaxies in filaments, as inferred from observations at lower redshifts.

천문우주관측기술

[구 AT-01] Status Report on All-sky Infrared Spectro-Photometric Survey Mission, SPHEREx

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Based upon the previous heritage in the complete development of the infrared imaging spectrometer, NISS (Near-infrared Imaging Spectrometer for Star formation history) onboard NEXTSat-1, we are participating in the NASA MIDEX mission (PI Institute: Caltech), the all-sky infrared spectro-photometric surveyor SPHEREx (Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer). The SPHEREx will provide us the first all-sky infrared spectro-photometric data set to probe the origin of our Universe, to explore the origin and evolution of galaxies, and to explore whether planets around other stars could harbor life.

After the SPHEREx have passed the PDR (Preliminary Design Review) on this September, the fabrication of flight hardware will be started soon. As an international partner, KASI takes part in the hardware development, the operation and the science for the SPHEREx. Here, we report the status of the SPHEREx project and the progress in the Korean participation.

[구 AT-02] Gamma-Ray Burst Observation by SNIPE mission

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For the space weather research, KASI (Korea Astronomy and Space Science Institute) is developing the SNIPE (Small-scale magNetospheric and Ionospheric Plasma Experiment) mission, which consists of four 6U CubeSats of ~ 10 kg. Besides of space weather research, the SNIPE mission has another astrophysical objective, detecting Gamma-Ray Bursts (GRB). By cross-correlating the light curves of the detected GRBs, the fleet shall be able to determine the time difference of the arriving signal between the satellites and thus determine the position of bright short bursts with an accuracy $\sim 100'$. To demonstrate the technology of the GRB observation, CSI gamma-ray detectors combined with GPS and IRIDIUM communication modules are placed on each SNIPE CubeSat. The time of each spacecraft is synchronized and when the GRB is detected, the light curve will be transferred to the