catalogues is necessary to optimize the future analysis of data. I will present the mock neutral hydrogen catalogues that we are developing, using the Horizon run 4 simulations, to cross-correlate with mock galaxy catalogues from low redshift surveys and I will show the preliminary results from the first mock catalogues.

[구 CD-06] Simulating the Lyman-Alpha Forest with Massive Neutrinos and Dark Radiation for Large-Volume Surveys

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In support of current and upcoming large-volume cosmological surveys such as the SDSS-IV eBOSS, LSST, and DESI, we present an extensive suite of high-resolution cosmological hydrodynamical simulations spanning a large range of cosmological and astrophysical parameters. We follow the evolution of gas, dark matter, neutrinos, and dark radiation, and consider several combinations of box sizes and number of particles - enhancing the resolution up to 3 x 33283 = 110 billion particles in a (100 h−1 Mpc)3 box size. We also provide 100,000 skewers for a variety of redshift slices and combination of cosmological and astrophysical parameters, useful for interpreting upcoming high-quality Lyman-α forest data. These novel simulations represent an improvement over our previous runs, and can be useful for a broader variety of cosmological and astrophysical applications, ranging from the three-dimensional modeling of the Lyman-α forest to cross-correlations between different probes, for studying the expansion history of the Universe including massive neutrinos, and for particle-physics related topics.

천문우주관측기술

[구 AT-01] Infrared Spectro-Photomeric Survey Missions: NISS & SPHEREx

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The NISS (Near-infrared Imaging Spectrometer for Star formation history) onboard NEXTSat-1 was successfully launched on last December and is now under the operation phase. The capability of both imaging and spectroscopy is a unique function of the NISS. It has realized the imaging spectroscopy (R~20) with a wide field of view of 2 x 2 deg. in a wide near-infrared range from 0.95 to 2.5μm. The major scientific mission is to study the cosmic star formation history in the local and distant universe. It also demonstrated the space technologies related to the infrared spectro-photometry in space. The NISS is performing the imaging spectroscopic survey for local star-forming galaxies, clusters of galaxies, star-forming regions, ecliptic deep fields and so on.

As an extension of the NISS, the SPEHREx (Spectro-Photometer for the History of the Universe Epoch of Reionization, and Ices Explorer) was selected as the NASA MIDEX (Medium-class Explorer) mission (PI Institute: Caltech). As an international partner, KASI will participate in the development and the science for SPHEREx. It will perform the first all-sky infrared spectro-photometric survey 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. Compared to the NISS, the SPHEREx is designed to have a much wider FoV of 3.5 x 11.3 deg. as well as wider spectral range from 0.75 to 5.0μm. Here, we introduce the status of the two space missions.

[구 AT-02] Possible framework for East Asia Observatory (EAO) and Subaru partnership

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Recently, there have been discussions among national observatories in East Asia about the possibility of EAO and the Subaru observatory forming a partnership. The official EAO-Subaru partnership can make the powerful wide-field observation capabilities of Subaru available to Korean astronomers through EAO, and also can serve as an excellent platform to gather astronomers in East Asia together for flourishing regional collaboration activities. A working group