구 두 발 표 초 록

초 청 강 연

[초 IT-01] Overview of Astrophysical Turbulence

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천문학적 유체는 대부분 자기장을 가지고 있으며 난류 상태에 있다고 믿어진다. 본 발표에서는 다양한 환경에서 존재하는 자기유체역학적(MHD) 난류를 소개하고자 한다. 첫째, 가장 간단한 경우로 비압축성 유체에서 발생하는 MHD 난류를 살펴보고자 한다. 이 경우, 평균자기장의 세기가 약한 경우와 강한 경우로 나누어 볼 수가 있는데, 평균자기장의 세기가 아주 약한 경우 난류에 의한 자기장의 증폭 현상이 특히 중요하다. 평균자기장의 세기가 강한 경우는 난류의 스펙트럼과 구조가 큰 관심사가 되고 있다. 둘째, 작은 스케일 난류와 초음속 압축성 난류를 간단히 소개하고자 한다. 작은 스케일(이온의 자이로 반경 부근) 난류는 아직 연구가 미진한 분야 중 하나이고 초음속 압축성 난류는 해석적 연구가 어렵기 때문에 연구의 많은 부분을 수치계산에 의존하고 있다. 마지막으로, MHD 난류에 대한 지식이 어떻게 관측에 응용될 수 있는지 간단한 예를 들고자 한다.

[초 IT-02] Subaru Strategy for 2020's

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Subaru Telescope, NAOJ

Strategic plan of Subaru science and operation will be introduced. Currently, Subaru has wide variety of instruments, conducts only classical observations, with less than 5 nights allocation for each proposal. Near future, Subaru will emphasize on surveys, introduce queue mode observations, reduce the number of instruments, and concentrate on large size programs. Large surveys are called Subaru Strategic Programs (SSPs). HSC-SSP is on-going (300 nights for 5 years), PFS-SSP will start at around 2020 (360 nights for 5 years), and IRD-SSP from 2016 (TBD). HSC science includes 1) cosmology with gravitational lensing, 2) lensing studies of galaxies and clusters, 3) photometric redshifts, 4) the Solar system, 5) the Milky Way and the Local Group, 6) AGN/quasars, 7) transients, 8) galaxies at low/high redshifts, and 9) clusters of galaxies. PFS science includes 1) cosmology, 2) galaxy & AGN, and 3) galactic archaeology. Subaru is planning the third pillar instrument, so called ULTIMATE-Subaru, which is the GLAO optical-NIR wide field camera & multi-IFU spectrograph for finding galaxies at ultra high redshift (z>10). Finally the strategy from Subaru to TMT will be presented. Subaru will conduct four major SSPs (HSC, PFS, IRD, ULTIMATE-Subaru) in coming decade to provide targets to TMT. HSC performs wide field surveys to reveal the distribution of dark matter in the Universe. IRD surveys Earth-like young planets to discover ~20 Earth-like habitable planets. PFS studies the expanding Universe to provide a few million emission line galaxies to TMT.

[초 IT-03] The Development of the East Asian Observatory

Paul Ho
EAO/JCMT director

The East Asian Observatory (EAO) was established in 2014 by the East Asian Core Observatories Association (EACOA). The goal of the EAO is to build and operate world-class facilities on behalf of the East Asian regions, as a counterpart to the European Southern Observatory (ESO). Leading astronomical facilities such as ALMA, TMT, GMT, and SKA are mega projects which require enormous economic resources. It is difficult for any observatory or any country to fund such facilities on its own. EAO intends to combine the resources and manpower in our East Asian regions, in order to play a leading role in the next generation frontier instruments. The EACOA institutes: NAOC, NAOJ, KASI, and ASIAA, have authorized the EAO to take on the operations of the James Clerk Maxwell Telescope (JCMT) on Mauna Kea as their first joint venture. In this talk, we will report on the development of EAO, our current operations of JCMT, and our future aspirations.

[초 IT-04] Exoplanet Science and Cosmology with the GMT-Consortium Large Earth Finder (G-CLEF)

Andrew Szentgyorgyi for the G-CLEF Collaboration
Harvard Smithonian Harvard-Smithsonian Center for Astrophysics, PI of G-CLEF

The GMT-Consortium Large Earth Finder (G-CLEF) is an optical band echelle spectrograph that has been selected as the first light instrument for the Giant Magellan Telescope (GMT). G-CLEF is

a general purpose high dispersion instrument that is fiber-fed and capable of extremely precise radial velocity measurements. G-CLEF has undergone a preliminary design review in April 2015 and is now entering final design phase and construction. G-CLEF has been designed to measure the mass of Earth-analogue exoplanets and to make critical observations in near-field and high-Z cosmology. We describe the G-CLEF instrument and several key science missions that shaped the development of G-CLEF. First light on the GMT is scheduled for late 2020.

[초 IT-05] Young Open Clusters: Their Uses in Star Formation Studies

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Open clusters are one of stellar systems consisting of a few hundreds to thousands of stars. The cluster members are, in general, believed to be a coeval stellar population at the same distance, and therefore they have almost the same properties in chemical composition and kinematics. Owing to these advantages, the clusters are utilized in many astronomy studies, such as the calibrations of distance and stellar age scales, assessments of stellar evolution theories, and the chemical evolution of the Galactic disk. Young open clusters are, inter alia, superb objects to study star formation process as most of stars are known to be formed in clusters. In this talk, I will review the uses of these young open clusters in star formation studies based on the ongoing work of our research group on the stellar initial mass function, an age spread problem, mass accretion rate of pre-main sequence stars, and a feedback of high-mass stars on surroundings.

외부은하 / 은하단

[박 GC-01] Selection of High Redshift Quasars with Multi-wavelength Data

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High redshift quasars (z > 5) hold keys to understanding the evolution of the universe in its early stage. Yet, the number of high redshift quasars uncovered from previous studies is relatively small (70 or so), and are concentrated mostly in a limited redshift range (z ~ 6). To understand the early mass growth of supermassive black holes and the final stage of the cosmic reionization, it is important to find a statistically meaningful sample of quasars with various physical properties. Here we present a survey for high redshift quasars at 5 < z < 7. Through color selection techniques using multi-wavelength data, we found quasar candidates and carried out imaging follow-up observations to reduce contaminants. After optical spectroscopy, we discovered eight new quasars. We obtained near-infrared spectra for 3 of these 8 quasars, measured their physical properties such as black hole masses and Eddington ratios, and found that the high redshift quasars we discovered are growing via accretion more vigorous than those of their lower redshift counterparts. We estimated the quasar number densities from our discoveries and compared them to those expected from the quasar luminosity functions in literature. In contrast to the observed number density of quasars at z ~ 5, which agrees with literature, the observed number density at z ~ 7 shows values lower than what is expected, even after considering an extrapolated number density evolution. We conclude that the quasar number density at z ~ 7 declines toward higher redshift, more steeply than the empirically expected evolution.

[구 GC-02] Mapping the Polarization of the Radio-Loud Lyman Alpha Nebula B3 J2330+3927

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Lyα nebulae, or "Lyα blobs", are extended (~100 kpc), bright (L[Lyα] ~ 1044 erg/s) clouds of Lyα -emitting gas. The origin of the Lyα emission remains unknown, but recent theoretical work suggests that measuring the polarization could discriminate among powering mechanisms. we will discuss current status of Lyα polarization observations at high-redshift and our on-going survey program. We will present the first narrow-band, imaging polarimetry of a Lyα blob, B3 J2330+3927 at z=3.09, with an embedded, radio-loud AGN (C. You et al. in prep.). The AGN lies near the blob's Lyα emission peak and its