AKARI OPEN TIME OBSERVING PROGRAMMES FOR PHASE-3-I

APPROVED PROPOSALS (JAPAN/KOREA TIME)

Proposal: H2IRC
Title: Akari IRC Grism Spectroscopy of Extragalactic Strong H2 Emitters
PI: Egami Eiichi (Steward Observatory, University of Arizona)
Abstract:

Over the last few years, our team has discovered a number of extragalactic strong H2 emitters using IRS on the Spitzer Space Telescope. Some of them are associated with strong star formation while others are not. The amount of a warm H2 gas we find in some of these systems is spectacularly large, reaching up to 1010 Msun.

As we discover more and more such sources, the scientific focus is now shifting to the identification of the excitation mechanism. However, the pure-rotational lines we detect with Spitzer/IRS provide little information in this regard.

Here, we propose to conduct a spectroscopic follow-up observations of these strong H2 emitters using Akari/IRC, taking advantage of its capability to obtain spectra in the 2.5-5um range, a crucial range to detect H2 ro-vibrational lines, which should enable us to decipher the excitation mechanism(s) in these extraordinary objects.

Proposal: ABCGA

Title: Activity of Brightest Cluster Galaxies probed by AKARI

PI: Hwang HoSeong (Korea Institute for Advanced Study)

Abstract:

We propose to observe 15 brightest cluster galaxies (BCGs) using the AKARI NIR spectrograph to understand the feedback process between BCGs and cooling flow (CF). Using the NIR spectra, we are going to measure the equivalent width of 3.3 micron PAH emission line and continuum slope, and to estimate the optical depth at 3.1 and 3.4 micron dust absorption lines, which are useful to study the connection between star formation and AGN. Primary goals of our study are 1) to identify the energy source (star formation or AGN) of BCGs clearly by detecting hidden AGN activity, and 2) to compare BCGs' activity with the characteristics of CF.

Proposal: SSSGG

Title: Slitless Spectroscopic Survey of Galaxy Groups

PI: Hwang HoSeong (Korea Institute for Advanced Study)

Abstract:

We propose to conduct NIR slitless spectroscopic survey for 30 galaxy groups to detect the enhanced star formation (SF) or AGN activities of group galaxies. Using the NIR spectra, we are going to measure the equivalent width of 3.3micron PAH emission line and continuum slope, and to estimate the optical depth at 3.1 and 3.4micron dust absorption lines, which are useful to study the connection between star formation and AGN. Primary goals of our study are 1) to detect the SF/AGN activity in group galaxies, 2) to characterize the energy source (SF or AGN) of group galaxies clearly by detecting hidden AGN activity, and 3) to compare the SF/AGN activities in group galaxies with global properties of galaxy groups.

Proposal: DPQSO

Title: Deep NIR Spectroscopy of QSOs at z > 4

PI: Im Myungshin (Seoul National University)

Abstract:

We propose to perform a deep NIR spectroscopy of QSOs at z > 4 in the area near North Ecliptic Pole. Our previous (open time program, HZQSO) and the current mission program (QSONG) have been producing the rest-frame NIR spectra of QSOs at such high redshifts, only possible with AKARI. However, in order to study the rest-frame optical spectra of high redshift QSOs in detail, it is necessary to build up enough S/N (Fe complex, [OIII] line, and H-β). Building up sufficient S/N requires repeated observation, which is only possible in the ecliptic pole area. We have selected 4 QSOs at z > 4 near the NEP, and we will observe them to 25 pointing depth, to reveal the detailed picture of z > 4 QSO rest-frame optical spectra for the first time.

Proposal: HQSO2

Title: Supermassive Black Holes at z > 5.4

PI: Im Myungshin (Seoul National University)

Abstract:

We propose NIR spectroscopic observation of 16 high redshift QSOs at z > 5.4. During the AKARI phase 1+2 observations, we have performed a NIR grism/prism study of 14 QSOs at z > 4.5, detecting Hα lines in the spectra of 8 QSOs at z > 4.5 for the first time and determining the mass of the central black holes in them. The surprising result from the HZQSO is the lack of very massive SMBHs (~1010 Msun) at z > 5. Building up on the success of the open time program, we are currently performing a phase-3 mission program, QSONG, which observes 130 QSOs at 3.3 < z < 5.4 with the AKARI IRC NIR grism. The QSONG will pin down the mass distribution of QSOs at 3.3 < z < 5.4, but the QSONG sample does not extend above z > 5.4 where the deficiency of very massive SMBHs becomes significant. Here, we propose to observe 16 QSOs at z > 5.4 in order to study the important epoch where the growth of the SMBHs seems to be occurring. This observation will most likely triple the number of the high-z QSOs with the mass measurement based on Hα, and will provide us with a clearer picture of the history of the growth of the SMBHs in the universe than ever before.

Proposal: GOALS
Title: Galaxy Evolution induced by galaxy interaction based on GOALS sample
PI: Inami Hanae (The Graduate University for Advanced Studies (ISAS/JAXA))
Abstract:

GOALS project (Great Observatory All-Sky LIRG Survey; Armus P.I.) is a Spitzer Legacy program, a comprehensive multiwavelength imaging and spectroscopic survey of 180 LIRGs and 23 ULIRGs in the local universe but which lacks any significant spectroscopic coverage at Akari IRC wavelengths. The GOALS sample is based on IRAS Revised Bright Galaxy Sample (RBGS), which is a complete sample of extragalactic objects with IRAS 60 micron flux densities above 5.24 Jy and covering the full sky Galactic latitudes above five degrees. An important sub-sample of GOALS are those 88 LIRGs with L > 1011.4 Lsun - the luminosity at which the space density of LIRGs exceeds that of optically selected galaxies. These 88 bright LIRGs have been observed with the IRAC, MIPS and IRS instruments on the Spitzer Space Telescope, the ACS and NICMOS on-board the HST, the ACIS on the Chandra X-ray Observatory and with GALEX. These multi-wavelength datasets provide excellent coverage from the X-ray through the infrared, allowing us to build complete SEDs.

Our objectives of the proposal are (1) to estimate continuum (hot-to-cold thermal dust) emission and emission/absorption lines in LIRGs through near- to mid-infrared SEDs, (2) to built more accurate starburst/AGN diagnostics with combination of Akari and GOALS data, and (3) to investigate these diagnostics as a function of LIRG morphology and luminosity. Akari is the only platform sensitive enough to obtain near-mid infrared spectra of a large number of LIRGs and thus provide a solid, global estimate of the importance of AGN emission (via hot dust) and star formation (via cold dust, 3.3 micron PAH, and Br-α emission).

We propose two IRCZ4 spectroscopic and one IRCZ3 imaging pointings for each of 45 LIRGs selected from the sample of 88 which have not been previously targeted with Akari. Then the priority A and B total request pointing is 120: 20 targets for each priority and 3 pointings for each target (the rest five is priority C). We will complete all of LIRGs with L>1011.4 Lsun except Akari mission program observed or reserved sources. Our 45 LIRG targets sample are in many merging/interaction phases and this is one of the most important selection criteria of us. Hence, we need to complete sample of 88 without any selection bias since our purposes are to compose precise starburst/AGN diagnostics, to study the diagnostics probably related on morphology and luminosity, and to understand galaxy evolution caused by galaxy-galaxy interaction.

Proposal: ATLAS
Title: Making a 3 to 5 um spectroscopic atlas of galactic evolved stars
PI: Ita Yoshifusa (National Astronomical Observatory of Japan)
Abstract:

We propose to make a spectroscopic atlas of galactic S-type stars, post-AGB stars, luminous blue variables, and Wolf-Rayet stars by observing them with AKARI/IRC using AOTZ4/NG spectroscopic mode. They are all in the late stage of their evolution, but differ in their initial mass. We carefully selected 286 well studied and flux limited sample stars that have 2MASS K-band magnitudes of 2.3 < K [mag] < 8.5, so that they are not saturated in the NG grating spectroscopic mode, and also that we can take spectra with high signal-to-noise ratio (S/N > 20) over the whole wavelength range that IRC's NG grating covers (3 to 5 um).

The 3 to 5 um spectroscopic data will enable us to study their photospheric and also circumstellar chemistries, to check the existence of PAH molecules, and also to know ionization conditions close to the star. Especially, it is known that the spectra of S-type stars are significantly different one by one, because small changes in their surface C/O ratio (C/O about 0.95 -- 1.05) will make large changes in their photospheric and circumstellar chemistries. By observing a large number of well-studied S-type stars, we study how spectrum change with the increase of C/O ratio. Some of our sample stars have been observed by SWS on ISO satellite that is capable of taking spectra in that wavelength range. Because almost all of our sample stars show chromospheric and/or atmospheric activities (e.g., stellar pulsation), then it is more preferable if there are previous observations, since we also want to study how the spectral features vary with these "activities".

Combining the AKARI spectrum with the existing data, we study the correlations between the equivalent widths of some spectral features and the mid-infrared colors (using IRAS, MSX, and also AKARI all-sky survey data), which are also correlated with circumstellar dust properties and hence the mass-loss from stars.

We explore dust condensation processes in these evolved stars, if any. These types of stars are considered to be dust sources in the interstellar medium of our Galaxy. The only missing type of dust producers is supernovae, but they have been observed with AKARI by other investigators.

Repeated spectroscopic observations are also made on some targets to see the time variations of spectral features.

The total pointings requested for this proposal is 316.

Proposal: P3SMC
Title: The role of pulsation in mass loss along the AGB, take 2
PI: Ita Yoshifusa (National Astronomical Observatory of Japan)
Abstract:

We propose to make a complementary observation toward two 10' x 10' areas, which have been observed as part of the AKARI Open Time Program, "The role of pulsation in mass loss along the Asymptotic Giant Branch (PI. Y.Ita)". Although we are approved to observe the two regions with imaging mode in NIR&MIRS and MIRL, and also spectroscopic mode in NP&SG1&SG2, AKARI ran out of its on-board supply of cryogen, liquid Helium before the allocated observing date. Then we have only spectroscopic data for an area, and only imaging data for the other. Therefore, we want to take imaging data for an area, and also NP spectroscopic data for the other.

The preliminary analysis of data taken in the Phase1&2 showed that there are very red and bright sources in the two areas. They may be heavily mass-losing AGB stars, which are very rare but should hold keys to understand stellar mass-loss. The combined data of AKARI, Spitzer (mid-IR), IRSF/SIRIUS (NIR), Zaritsky (Optical) will enable us to estimate their mass loss rates and also the NP spectroscopic data will tell us their chemistries.

Our primary goal is to study the role of pulsation in the mass loss process and their infrared characteristics. We also aim to study the dependence of metallicity on the mass loss and the AGB evolution by comparing the results from this proposed observation with the AKARI LMC survey.

The total pointings requested for this proposal is 3.

Proposal: YPUMA

Title: Search for Young Planets in the Ursa Major Cluster

PI: Itoh Yoichi (Graduate School of Science, Kobe University)

Abstract:

Two models are currently proposed for planet formation; the disk instability model and the core accretion model. The previous search for proto-planets by the Subaru Telescope concluded that it is very rare chance for planet formation by disk instability, at least, with a large separation. We propose imaging search for young planets around 18 young dwarfs of the Ursa Major cluster. If a planet forms by core accretion process, it should be detected in vicinity of a young dwarf by thermal infrared imaging with high sensitivity. Due to its proximity (<25 pc) and youth (500 Myr), this cluster is the best target for searching of young planets formed by core accretion process.

Proposal: CLNSL

Title: NIR Spectroscopy of Composite and LINER LIRGs

PI: Lee JongChul (Seoul National University)

Abstract:

We propose near infrared spectroscopy (NIR) of composite galaxies and low-ionization narrow emission-line regions (LINERs). Target are selected base on the infrared galaxies of Hwang et al. (2007) with a wide range of infrared (IR) luminosity. We will measure the equivalent width of 3.3 micron PAH emission line and the NIR continuum slope, and estimate the optical depth at 3.1 and 3.4 micron from the spectra. Using these parameters, we will search for the hidden active galactic nuclei (AGNs), and constrain the characteristics of power source in the composite galaxies and LINERs. We will also investigate the dependence of star-formation and/or AGN activity on IR luminosity. Our targets are the Sloan Digital Sky Survey selected sample, so we can obtain their various optical properties. Then we will study any correlations between these optical features and NIR features.

Proposal: ISBEG

Title: Infrared Spectroscopy of Blue Early-type Galaxies

PI: Lee JoonHyeop (Korea Astronomy and Space Science Institute)

Abstract:

We propose an infrared (IR) spectroscopic survey of Blue Early-type Galaxies (BEGs) in the Sloan Digital Sky Survey. BEGs are early-type galaxies with unusually blue colors, which are expected to be in the final phase of early-type galaxy formation. To understand the evolutionary mechanism of BEGs, it is necessary to distinguish the energy sources of BEGs between star formation (SF) and AGN. The main scientific goals in this survey are: 1) estimation of 3.3 micron PAH emission and continuum features in BEGs as SF/AGN indicators; 2) comparison between the optical features and the IR features of BEGs; and 3) investigation of the luminosity and redshift dependence of the IR features. We select 59 target BEGs with Ks < 12.5 Vega mag, at 0.02 < z < 0.1. Each target is proposed to observe with 2 pointings, using the IRCZ4 AOT with the grism (b) and the point source aperture (Np). This survey is expected to reveal the nature of BEGs including their SF/AGN composition, so that we can comprehend what is going on in BEGs and how BEGs are connected to typical red early-type galaxies.

Proposal: SFICE
Title: Ices in Star Forming Cores
PI: Lee JeongEun (Sejong University)
Abstract:

We propose to use AKARI/IRC spectroscopy to observe 32 YSOs, VeLLOs, and background stars, in order to study the chemical and thermal conditions in the star forming cores. A wide variety of observations (including SST IRAC, MIPS, and IRS observations) have been acquired toward those sources, and these complimentary data set will be combined with the NIR spectra, which trace the composition of icy grain mantles.
We have a self-consistent model for the process of star formation, which couples the chemical evolution with the dynamics of surrounding material and the evolution of the central luminosity. The ice features of H2O, CO, and CO2 covered by the AKARI/IRC spectra are vital to constrain the dust and chemical properties in our self-consistent model.
In addition, comparisons of ice features of VeLLOs with those toward normal YSOs and background stars will provide a crucial opportunity to understand the dynamical process of VeLLOs.
Therefore, the obtained NIR spectral data cubes acquired by the proposed observations will enable three scientific goals:
(1) to compare ice features in various evolutionary stages of star formation from molecular clouds to Class 0, I, and II protostellar cores,
(2) to understand the dynamical process in VeLLOs, and
(3) constrain self-consistently our chemical and dynamical evolutionary model.

Proposal: WDISK

Title: A Focused Search for Circumstellar Dust Orbiting White Dwarfs

PI: Lee JeongEun (Sejong University)

Abstract:

We propose to use Akari to observe 10 single, metal-polluted white dwarfs to search for an infrared excess. Such an excess, already known for about 10 other white dwarfs, likely is the consequence of the tidal-disruption of a minor planet, resulting in a dust distribution analogous to Saturn's rings. Our proposed Akari observations target 5 hydrogen-rich white dwarfs with accretion rates greater than 3 x 108g s-1 and will test the prediction that these stars display an infrared excess. We also propose to observe 5 helium-rich white dwarfs with [Ca]/[He] > -8.0 to determine whether these metal-enhanced stars also have an infrared excess. With an improved understanding of the tidal-disruption scenario, we will further our ability to use white dwarf photospheric abundances to constrain the origin and evolution of minor planets --- the building blocks of terrestrial planets. Current data on contaminated white dwarfs show that their pollutants are deficient in carbon relative to other metals by at least a factor of 10. This result parallels the observed composition of the inner planets in our solar system and provides a strong, but as-yet poorly understood, constraint on models for planet formation.

Proposal: BRSFR

Title: Extinction-Independent Determination of SFR in Star-forming Galaxies

PI: Matsuhara Hideo (ISAS/JAXA)

Abstract:

One of the most fundamental properties of galaxies,their star formation rates (SFRs), are currently determined from applying recombination theory to H emission lines to infer the ionizing photon luminosities produced by O/B stars. Unfortunately, the "gold standard" line, Hα, is known to be very susceptible to extinction by interstellar dust. The limited measurements of H lines in the infrared in fact suggest that Hα often misses MOST (>90percent) of the ionizing luminosity from newly formed stars, embedded in dust. Using the definitive Brα line (which suffers an extinction of only 0.035 Av), Akari/IRC has shown that this is the case in many ULIRGs. By measuring reliable Brα/Hα ratios, we will determine whether the Hα method for estimating SFRs in more normal, less luminous star-forming galaxies can be salvaged, or needs a radical overhaul. The key to defining our targets has been examining direct narrow-band filter imaging of Hα in a large sample of galaxies at cz~ 7000km/sec. This allowed us to identify those with bright enough lines (Hα-estimated SFRs of 1Sun/year) in a compact spatial distribution suitable for measurement in the IRC 1-arcminute aperture. Even under the conservative assumption of only 1 magnitude of absorption at Hα, the Brα lines in all 30 of the target galaxies will be well detected in 3 to 6-pointings. This new exploration of Brα (and secondarily the PAH feature) as reddening-free SFR indicators requires this sample size to probe a wide range of galaxy properties.

Proposal: HOTCO

Title: Dense Molecular Gas interacting with Outflows of the Starbursts

PI: Minh YoungChol (Korea Astronomy and Space Science Institute)

Abstract:

We plan to observe the CO 4.7 micron fundamental ro-vibrational band toward two starburst galaxies, M82 and NGC253. These sources are nearby (~3.5 Mpc) archetypical starbursts having large star formation rates (~2-4 Mo/yr), estimated from the strong infrared emission in the nuclear region. Both have prominent galactic-scale nuclear outflows associated with starbursts. The dense molecular gas in the nuclear region makes up 10% of the circumnuclear dynamical mass and fuels large star formations. The strong nuclear outflows will generate shocks in the surrounding dense gas. The major cooling agents of the shocked gas are thought to be CO, H2O,and OH, and the CO fundamental emission bands is an ideal tracer of the dense post-shock gas. Although the prominent nuclear outflows are thought to be originated from the mechanical power of the supernovae, it is still not known how they are related with starbursting regions. In addition, the outflows also trigger the next generation starburst in the surrounding molecular clouds (e.g., Minh et al. 2007), but the actual connection between the outflows and the embedded starburst is not clear. Using the excitation-radiation model of CO, we plan to investigate the morphology and kinematics of warm (~500 K) and dense (n(H2) > 107 cm-3) post-shock gas in the galactic center to study the origin and nature of the associated nuclear outflows.

Proposal: MAGNE
Title: Infrared/Optical Emission Mechanism of Magnetars
PI: Morii Mikio (Rikkyo University)
Abstract:

We propose to observe three magnetars with Akari to understand the infrared/optical emission mechanism. Several models have been proposed for the emission mechanism, which are based on the magnetospheric emission, disk emission, and hybrid of them. By the SED fitting for the spectrum obtained by Akari, Spitzer, and near-infrared/optical observations, the disk models can be tested. Emission features are expected in the mechanism of the magnetospheric origin (cyclotron line and maser frequency peak). By twice observations with a half year interval, variability of the SED also can be checked and hence the correlation with the X-ray flux is also tested. Disk model would produce strong and wide impact on astrophysics, not only on pulsar astronomy, but also on mechanism of supernova explosion and planet formation.

Proposal: CASSP

Title: Dust and Molecules Formed in the Cas A Supernova Remnant

PI: Onaka Takashi (Department of Astronomy, University of Tokyo)

Abstract:

We propose to observe the young supernova remnant Cas A with AKARI IRC to detect the CO fundamental band, dust features, and ionic lines. Spitzer observations of Cas A with IRAC and IRS indicate that some 0.05 solar masses of dust were freshly formed in the ejecta. The near-infrared emission (<3 microns) is from synchrotron emission, and the mid-infrared wide-band spectra are a mix of lines and dust. At present, there is no explanation for the brightness of IRAC band 2 (4-5 microns) based on existing dust models and known gas lines. We suggest the presence of a CO fundamental band due to ejecta that failed to condense into dust. A ground-based (Palomar) narrow-band image in the CO overtone band (2.3 microns) appears to detect faint CO emission, confirming its presence but at the level required to explain all of the IRAC channel 2 emission. Near-infrared spectroscopy with AKARI will directly detect the CO fundamental band as well as other possible lines (like Brα). Presence of significant quantities of warm CO in Cas A indicate ongoing processes of astrochemistry in a 300-yr old SNR. Since CO is the most important molecule in astrochemistry (in particular in the H-poor ejecta), the proposed observations will be diagnostic of physical conditions such as the temperature and density, and degree of mixing in the SN ejecta. Understanding incomplete dust formation in supernovae will advance our understanding of dust formation efficiency in SNe and dust production in SNe in early Universe.

Proposal: PNSPC

Title: Near-Infrared Spectroscopy of Planetary Nebulae

PI: Onaka Takashi (Department of Astronomy, University of Tokyo)

Abstract:

We propose to make a systematic near-infrared spectroscopic observation of planetary nebulae (PNe) and investigate the destruction process of the unidentified band (UIR) carriers under strong ultraviolet radiation fields. The 3.3 micron UIR band carriers are thought be most sensitive to harsh conditions and the correlation of its presence/absence with the age of PNe will indicate the destruction efficiency of the band carriers. 87 planetary nebulae with known kinematic distance are selected, whose ages range 600 to 30000 yr. Near-infrared spectroscopy of IRC provides information not only on the 3.3 micron UIR band, but also on hydrogen recombination and forbidden ionic lines, latter of which the physical conditions and ultraviolet radiation intensity in the nebula can be derived from. The present observation will enable a systematic investigation of the UIR band carrier processing in the radiation field. It will also provide a near-infrared spectrum atlas of PNe for the first time owing to the unique capability of IRC.

Proposal: NEWSY

Title: Near-IR Spectroscopy of Galaxies; Waiting for Supernovae Momentarily

PI: Sakon Itsuki (University of Tokyo)

Abstract:

In this program, we plan to obtain the near-infrared slit-less spectroscopic datasets of nearby galaxies in preparation for a future supernova there. Our samples in the target list have relatively higher supernovae frequency (10-20 years per a supernova) and 2-3 supernovae per year, in total, are expected in our samples. The data obtained in this program is definitely important to obtain the accurate near-infrared spectra of supernovae expected to explode in a future during the lifetime of AKARI. the near-infrared spectra from 2 to 5.5um of the core-collapse supernova within less than 1 year after the explosion have ever been obtained for only two cases including the SN1987A and the SN2006jc and, therefore, those datasets for other future supernovae are highly desired. AKARI/IRC is, so far, the only instrument that are capable of obtain the near-infrared (from 2 to 5.5um) spectra of supernovae within 6 months after explosion. The obtained datasets in this program are quite useful to derive these spectra of supernovae with higher accuracy, which will surely help us understand the role of massive stars in the formation of interstellar dust and reveal what the fundamental difference between the supernovae with and without the signs of dust formation should be. At the same time, we can obtain the near-infrared spectral catalogue of infrared sources for each galaxy in our samples via the robust data reduction techniques which we have developed to obtain the spectra of point-like sources embedded in complicated diffuse background structures.

Proposal: IEYSO

Title: Ices Around Extragalactic Young Stellar Objects

PI: Shimonishi Takashi (Department of Astronomy, Graduate School of Science, The University of Tokyo)

Abstract:

Properties of extragalactic Young Stellar Objects (YSOs) provide us important information on the understanding of the diversity of YSOs in different galactic environments.

The Large Magellanic Cloud (LMC), the nearest irregular galaxy to our galaxy, offers an ideal environment for this study. An infrared spectrum of YSOs shows absorption features of various ices which are thought to be an important reservoir of heavy elements and complex molecules in a cold environment.

We detected absorption features of the H2O ice 3.05um and the CO2 ice 4.27um stretching mode toward 7 massive young stellar objects (YSO) by the IRC LMC near infrared spectroscopic survey.

We calculated the column densities of the ices, and derived the average CO2/H2O ice ratio to be 0.64. This ratio is clearly higher than that seen in galactic massive YSOs of 0.17±0.03. We suggest that the strong ultraviolet radiation field and/or the high dust temperature in the LMC may be responsible for the observed high CO2 ice abundance.

It is inferred from our results that the YSOs in the LMC hold different chemical balance from the Galactic ones.

We selected 31 YSO candidates which show a hint of ice absorption features based on recent YSO catalog and near infrared spectrum taken by the IRC LMC survey.

We here propose IRC NG spectroscopic observations toward these 31 objects. The proposed observations should detect important species of ices such as H2O, CO2, CO, CH3OH, XCN simultaneously.

We try to clarify the reason of a high CO2 ice abundance in the LMC using the detection of XCN feature which is thought to be a tracer of strong UV radiation field and a detail profile analysis of 3.05um H2O ice feature which is thought to be a probe of an ice temperature. In addition, we try to investigate the correlation between ice abundances and physical environments of YSOs such as stellar parameters of central star or distribution of interstellar matter.

The proposed observations should clarify the reason of the high CO2 ice abundance in the LMC, and determine the chemical abundances of ices as functions of physical environments of YSOs. Near infrared spectra obtained in this observations should be a valuable dataset for the study of extragalactic YSOs and ices.

Proposal: YDRWF
Title: Hunting the Coolest Substellar Dwarfs
PI: Song Inseok (University of Georgia)
Abstract:

The very few lowest mass substellar companions discovered in previous imaging surveys at nearby stars and brown dwarfs are found to have large semi-major axes, typically hundreds of AU. We show that, at such large separations and toward old stars, one has the best chance to detect the coolest dwarfs, with effective temperatures of <~500K (the so-called "Y dwarfs"). Effective temperatures of 500K represent a region of temperature space that has yet to be probed. Therefore, the discovery of such cool objects will illuminate their physics and chemistry and will provide observational data to test planetary models. To discover one or more Y dwarfs, we are proposing to survey white dwarfs with ages >2Gyr that lie within 25pc of Earth with (post-helium) AKARI.

Proposal: ASCSG

Title: The AGN-starburst connection of Seyfert galaxies at z~0.36

PI: Woo JongHak (University of California Santa Barbara)

Abstract:

To investigate the AGN-starburst connection, we propose to measure starburst activity based on the 3.3 micron PAH emissions, using a sample of 29 Seyfert-luminosity AGNs at z~0.36. This epoch, z~0.36, is cosmologically interesting for studies of the coeval growth of black holes and their host galaxies, as suggested in our previous studies. With unprecedented multiwavelength data, covering from the hard X-ray to the mid-IR from our parallel programs (Chandra, Spitzer, HST, GALEX and Keck), we are in a unique position to accurately measure the AGN activity, i.e., bolometric luminosity, black holes mass, and the Eddington accretion rate, thus unveiling how black hole accretion is related with global starburst activity. Measuring "global" star formation rate of these host galaxies is only possible with the powerful slitless spectroscopy capability of the AKARI IRC. We ask 4 pointings for each object, 116 pointings in total, to obtain S/N~10 in the continuum for securely measuring the 3.3 micron PAH emission luminosity.