CONICYT
Ministerio de
Educación

Gobierno de Chile

Comisión Nacional de Investigación
Científica y Tecnológica – CONICYT

Resultados del Concurso 2013B para Observaciones en Gemini-Sur

Propuesta: G/2013B/13

Investigador Principal: Matthias Schreiber, Universidad de Valparaíso

Título: Accurate orbital orbital periods and component masses of three doubled-line double white dwarfs.

Resumen: Close double white dwarfs (CDWDs) are close compact binaries formed by two white dwarfs and are considered to be direct progenitors of Supernovae Type Ia (SN Ia). Unfortunately, current theories of the evolution and formation of CDWDs are subject to several serious unsolved problems which translate into e.g. large uncertainties in the predicted SN Ia rates. Observational constraints currently entirely rely on only nine CDWDs with accurately measured orbital and stellar parameters. We here propose to measure the masses of both components and the orbital periods of three doubled-line CDWDs to thus increase the number of CDWDs available for constraining current models by 30 per cent. These observations will additionally help in predicting when the two white dwarfs in these three systems will merge and if they are expected to explode as SN Ia.

Tiempo asignado: 16.7 horas

Propuesta: G/2013B/04

Investigador Principal: Sergio Torres-Flores, Universidad de La Serena

Título: Metallicty gradients and star formation in interacting galaxies

Resumen: Interacting systems are ideal laboratories to study galaxy evolution. During the collision process, gas coming from different regions of interacting galaxies can mix, producing a flattening in the radial distribution of metals in these systems. In order to study metallicty gradients in tidal tails of interacting systems and to investigate the relation between the gradients and the kinematics of the tails, we propose to obtain GMOS multi-slit spectra of a number of star-forming regions in two interacting systems: Arp314 and VV304. Our main goal is to obtain metallicities, ages and internal extinctions of regions located along the tails. This analysis will elucidate if interacting galaxies present flat and/or inverted metallicity gradients, as has been suggested from simulations. By complementing the data to be obtained here with kinematic Fabry-Perot data for the same systems (which we already have in hands) we will then relate the gradients with the presence or not of gas flows. We note that this proposal was approved in semester 12B, however, the original targets were not observed due to bad weather.

Tiempo asignado: 6.6 horas

Propuesta: G/2013B/12

Investigador Principal: Maria Teresa Ruiz, Universidad de Chile

Título: A new Y dwarf search probing the limits of WISE

Resumen: We propose to use FLAMINGOS-2, GNIRS and NIRI to follow-up candidate Y dwarfs from a new search of the WISE catalog. Our method uses WISE multiple measurements and photometric profile fit information to identify non-variable point sources which are detected only in the W2-band, the band most sensitive to very cool brown dwarfs. This search identifies 121 previously unknown candidates down to a S/N=8 limit and probes the lowest Teff that WISE is sensitive to. Initial near-IR followup produced photometry for 13 sources, of which 9 are T8 and earlier T types, three are new 500K T9 dwarfs and one is a new 400K Y0 dwarf. When followup is complete we should approximately double the known number of WISE brown dwarfs cooler than 500K. In 13B we request time to obtain J-band photometry for 85 sources, which make up 75% of our remaining unmatched sample. We expect to find ~8 new Y dwarfs, for which we will also obtain H-band photometry. For the brightest new Y dwarfs we will obtain spectra.
We expect there will be up to three more semesters where we request time for this project, to image and followup the remaining 25% of our sample, and confirm and characterize new Y dwarfs.

Tiempo asignado: 5.0 horas

Propuesta: G/2013B/15

Investigador Principal: Timo Anguita, Universidad Andres Bello

Título: Unveiling the nature of lensed "normal" galaxies in the redshift desert

Resumen: We have built a catalog of ~60 galaxy-galaxy strong lensing systems from fields of the RCS2. One of the unique properties of the systems in our catalog is that the strongly lensed sources can reach redshifts as high as z~3.5. Optical spectroscopy has confirmed the nature of several systems and the redshifts of both sources and lenses has been measured. However, some of the highest grade, most interesting lensed sources, lie on the so called "redshift desert" (1.5<z<3.0); precisely the most important star formation epoch. We propose for NIR spectroscopic observations with FLAMINGOS2 of the best four of such systems. The immediate results attainable with this dataset will be: i) the measure of the precise redshifts of the sources; the single most important geometrical constraint to perform lens models, and ii) the measure of the "observed" star formation rate of these high redshifts sources, which, if unlensed, would remain undetected. With this information we will perform details models of the lens LRGs to study their mass distribution. Furthermore, it will enable us to follow up these systems using 3D spectroscopy in the IR and submm. This will allow us to perform unprecedented source-plane reconstructions of the distribution of star formation, dust and molecular gas in "normal" galaxies at 1.5<z<3.0.

Tiempo asignado: 9.0 horas

Propuesta: G/2013B/05

Investigador Principal: Franz Bauer: Pontificia Universidad Católica de Chile

Título: GeMS Study of Supernovae in Luminous Infrared Galaxies

Resumen: Our collaboration has pioneered the use of Laser Guide Star Adaptive Optics to begin revealing the previously-hidden population of core-collapse supernovae within Luminous Infrared Galaxies (LIRGs).
We now wish to extend our survey to the southern LIRGs to exploit the significant improvement in PSF uniformity offered by GSAOI with GeMS. In Semester 2013B we will image 6 LIRGs for which we have earlier epochs of "classical" adaptive optics imaging, enabling us to start discovering supernovae straight away while acquiring a dataset of immense legacy value.

Tiempo asignado: 5.0 horas

Propuesta: G/2013B/17

Investigador Principal: Rodolfo Angeloni, Pontificia Universidad Católica de Chile

Título: Unveiling the giant jet of Sanduleak's star in the NIR with GSAOI

Resumen: We recently discovered an exceptionally large jet around Sanduleak's star, an enigmatic symbiotic system in the Large Magellanic Cloud (Angeloni et al. 2011). Extending 14 pc across the LMC, it is the largest bipolar stellar jet known so far, and the first extra-galactic stellar jet to be clearly resolved. This makes it an extremely valuable target for the study of the large-scale formation and evolution of astrophysical jets. While the discovery Magellan/Magic optical images have highlited the exceptional nature of the source and its gross morphology, their limited resolution prevents a thorough discussion of the jet's properties, origin and expansion through the surrounding environment. In order to largely improve our knowledge of the system, we propose here to obtain deep, broad and narrow-band images of the jet in the NIR by exploiting the outstanding capabilities of GSAOI at GEMINI South. These observations 1) would provide immediate scientific results by tackling the never observed infrared region; 2) would naturally complement the HST WFC3/UVIS observations scheduled for September 2013; 3) would have a high PR value, considering both the outstanding properties of Sanduleak's star jet, and the likely spectacular outcome of the proposed imagery.

Tiempo asignado: 9.0 horas

Propuesta: G/2013B/11

Investigador Principal: Ricardo Demarco, Universidad de Concepción

Título: Size evolution of early-type galaxies in the strongest z>1.5 overdensity in COSMOS

Resumen: Early-type galaxies (ETGs) host most of the stellar mass in the nearby Universe, dominate the high-mass end of the galaxy stellar mass function, and are the best tracers of the highest density peaks in large scale structures over most of the Hubble time. The way they form and evolve is thus central to the broader picture of galaxy evolution. Observational evidence shows that the bulk of high-redshift ETGs are smaller than that their local counterparts. However, results on a possible difference in galaxy size evolution between cluster and field environments at high redshift are still controversial. This is likely partly due to still very poor statistics, but results might also depend on redshift as well as on group/cluster mass. In order to improve the assessment of the difference in galaxy size evolution between overdense and field environments, we propose for Ks-band GSAOI observations to study rest-frame optical morphologies and sizes of massive passive galaxies in a z~1.7 structure in the COSMOS field.

Tiempo asignado: 12 horas

Propuesta: G/2013B/25

Investigador Principal: Tom Richtler, Universidad de Concepción

Título: Isolated ellipticals - key objects for the dark matter problem?

Resumen: The nature of dark matter is one of the deepest mysteries in astrophysics. The cold dark matter paradigm has its successes in cosmology, but faces challenges on the galaxy scale. Alternative concepts have their successes in modelling rotation curves and explaining the tight baryonic Tully-Fisher-relation. Isolated elliptical galaxies, not being exposed to external fields and often late mergers, are key objects. We already found objects at odds with cosmological simulations and perhaps will find more. Here we propose to investigate the isolated elliptical NGC 2865 using globular clusters and the technique of ultradeep mask spectroscopy.

Tiempo asignado: 10 horas

Propuesta: G/2013B/37

Investigador Principal: Steve Schulze, Pontificia Universidad Católica de Chile

Título: A systematic search of supernova components in gamma-ray bursts

Resumen: In the past years, it was generally assumed that all long-duration gamma ray bursts (LGRBs) were accompanied by supernovae (SNe). However, Fynbo et al.\,(2006) showed that two nearby LGRBs were not accompanied by a SN, despite observations were sensitive to detect a SN component that was several thousand times fainter than an average GRB SN. Currently, optical and NIR follow-up observations of GRBs and their possible SN component are based on and biased towards the brightest and most peculiar events. To improve this situation, we propose a systematic search for supernova components in all GRBs with redshifts less than one. This will enable a study of the progenitors of the different GRB populations from a homogeneous sample, enabling statistical arguments to be made on the differences between these distributions, and further constraints to be made on the nature of GRB progenitors. This is an effort in collaboration with the 10.4m GTC telescope.

Tiempo asignado: 13 horas

Propuesta: G/2013B/18

Investigador Principal: David Rodriguez, Universidad de Chile

Título: Characterizing Young, Low-Mass Stars Near Earth

Resumen: Recent work has led to the discovery of many young stars (ages <100 Myr) in moving groups less than 100 pc from the Earth. Our own research with the GALEX and WISE satellites has revealed many candidate young, low-mass stars throughout the whole sky. The measurement of spectral features such as Halpha and Helium emission as well as Lithium and Sodium absorption are key in estimating the ages of these late-type stars. We propose to use GMOS-S on the Gemini telescope to identify spectral features of youth for a sample of young star candidates that may be members of nearby moving groups with ages of ~10, 30, and 100 Myr. At present, the low- mass membership of these groups is poorly constrained; this proposal directly addresses this objective. Furthermore, it is important to pursue a more complete census of young, low-mas stars near Earth that can serve as excellent targets for direct imaging searches of young, massive planets.

Tiempo asignado: 15 horas

Propuesta: G/2013B/26

Investigador Principal: Sabrina Cales, Universidad de Concepción

Título: PIT_HighzQuasars_GeminiS2013B

Resumen: Investigations of the rest-frame optical spectral properties of luminous, high-redshift quasars have been small, hampered by low signal-to-noise ratios and/or low resolution, and generally have not yet been satisfactory. In particular, there has been nothing quite comparable to the study of Boroson and Green (1992) that first determined the spectral properties of a complete sample of bright, low-redshift quasars. This deficit has become especially important given that black hole mass estimation using the ultraviolet C IV line, commonly used for high-redshift quasars, suffers from biases associated with spectral properties.
In order to address these issues, we propose to obtain near-infrared, rest-frame optical spectra of a complete sample of luminous high-redshift quasars. Beyond establishing the unbiased spectral properties of these quasars, in conjunction with data from lower luminosity quasars already in hand, we will use Hβ-based masses to calibrate new and improved C IV-based black hole mass estimates (including new spectral and luminosity correction terms), critical to understanding the evolution of supermassive black holes and their host galaxies.

Tiempo asignado: 10 horas

Propuesta: G/2013B/06

Investigador Principal: Dante Minniti, Pontificia Universidad Católica de Chile

Título: Peering at the high-redshift nature of 10 unidentified hard X-ray sources

Resumen: The INTEGRAL and Swift sky surveys uncovered more than 1500 sources altogether above 20 keV. Despite the effort put in the identification process, a fraction of them (10% to 30%, depending on the survey) still remains unclassified. Correlations with catalogues and/or multiwaveband followup observations (especially at soft X-rays) suggest that a fraction of these sources may be very far: this allows us to probe the population of high-z, hard X-ray blazars. Since their distance often makes them quite faint in the optical band, spectroscopy with a large telescope is the only way to reveal their real nature. We here propose to observe 10 faint optical candidates of southern hard X-ray sources to determine their basic characteristics. This can ultimately allow us to constrain population studies of high redshift, hard X-ray blazars.

Tiempo asignado: 15.6 horas