

Resultados del Concurso 2015B para Observaciones en Gemini-Sur

Propuesta: G/2015B/027

Investigador Principal: Lucas Cieza, Universidad Diego Portales

Título: GPI Characterization of the Benchmark Brown Dwarf HD4747 B

Resumen: We propose to initiate a high-contrast imaging program with the Gemini Planet Imager (GPI) to target nearby stars that show evidence for the existence of a substellar companion as indicated by long-term radial velocity trends. The southern counterpart of the highly successful TRENDS project, the goal of our observations is to detect and characterize the objects responsible for the accelerating their parent stars. We propose to commence TRENDS-South by observing HD 4747 B, an exciting benchmark brown dwarf that was recently detected around a nearby G-star with a precise parallax. In particular, HD 4747 B will soon become the first ultra-cold dwarf with a mass, age, and metallicity that are known independent of theoretical evolutionary models. GPI observations will allow us to acquire the first spectrum for the object which is 300,000x fainter than its host star and separated by only 0.6". The results of our observations will establish an explicit connection between the properties of substellar objects and their mass, age, and composition, thus providing a much-needed anchoring point to guide the development of theoretical evolutionary models. This program was ranked high in B1 by the CL NTAC in 2015A, but fell

Tiempo asignado: 2,6 horas.

Propuesta: G/2015B/020

Investigador Principal: Lluís Galbany, Universidad de Chile

Título: New Approaches to Supernova Standardisation for Cosmology

Resumen: A new era of supernova cosmology has begun, requiring new techniques and probes to both reduce the systematic uncertainties and extend the redshift range into the deceleration phase of the expansion history of the Universe. The Dark Energy Survey (DES) offers such an opportunity by discovering thousands of supernovae across a wide range of redshifts with excellent multi-wavelength light-curves. To take advantage of our recent agreement between Chilean SN astronomers and DES, we propose a three-fold

Tiempo asignado: 10 horas.

Propuesta: G/2015B/005

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 it is likely we will find more. Here we propose to complete (because there is no roll-over option for Chilean programmes from band 1) our programme regarding the isolated elliptical NGC 7796 using globular clusters and the technique of ultra-deep mask spectroscopy.

Tiempo asignado: 7 horas.

Propuesta: G/2015B/018

Investigador Principal: Paulina Lira, Universidad de Chile

Título: Reverberation Mapping of high-*z* QSOs: the final stages

Resumen: Reverberation mapping provides the only tool for obtaining the Black Holes (BH) mass in Active Galaxies. So far this method has been successfully applied only to low and intermediate luminosity systems ($<10^{46}$ ergs/s). We are extending these studies by two orders of magnitude, probing the BLR size (and BH-mass) of luminous AGN at redshift $\sim 2-3$, the peak of the Quasar era. Such large, slowly varying systems require a monitoring strategy that will maximise the likelihood of detecting significant variability. Since 2006 we have been monitoring a few dozen very luminous Quasars using broad band imaging with the SMARTS consortium. Targets with significant variations have been followed up with the du Pont telescope covering Ly α , SiIV, CIV and CIII. Now we have identified a handful of sources with significant structure in their continuum and line curves which are very promising to deliver BH mass determinations in the next few years of monitoring. With this Gemini/F2 campaign we want to add the crucial low-ionization MgII line observed at $\sim 10,000-10,600$ Å, and in some cases H β at $\sim 17,500$ Å, to our monitoring campaign using the long slit capability of F2. Given the brightness of our sources, this would be a very economic proposal with a high scientific return.

Tiempo asignado: 1,5 horas.

Propuesta: G/2015B/007

Investigador Principal: Patricio Rojo, Universidad de Chile

Título: Investigating seasonal changes in Titan's meteorology through cloud monitoring with GPI

Resumen: The presence of condensable volatiles and a thick atmosphere make Titan unique among known extraterrestrial environments, providing a natural laboratory in which to study a hydrologic cycle on a body other than Earth. We propose to study this hydrologic system by monitoring its cloud systems with GPI as soon as they are detected through a concurrent monitoring campaign using RTOO triggers.

The combined analysis of morphology (as resolved by adaptive optics) and cloud top altitude variation (as diagnosed by spectra) will constrain climate system models, diagnose cloud formation mechanisms, and supply context for interpreting surface features observed by Cassini. Using our own pipeline we will determine cloud locations to within 15 degrees latitude and 5-10 km altitude.

Tiempo asignado: 1,8 horas.

Propuesta: G/2015B/033

Investigador Principal: Mariusz Gromadzki, Universidad de Valparaíso

Título: Trigonometric parallax of ancient T dwarf WISE0833+0052

Resumen: We propose to measure trigonometric parallaxes with GSAOI for fast moving late T dwarfs WISE 0833+0052 with kinematics of the thick-disk/halo. Such objects are very rare, only 5 are published until now. WISE 0833+0052 is only one object in our sample with a suitable natural guiding star for GSAOI. Knowledge of accurate distance allows us constraints its kinematic, and shed more light on its status and origin. Parallax distance is crucial for this goal, and the colours of our target mean that the near-infrared is optimal for the required high precision astrometry. Additionally, this observations allow us test binary of WISE 0833+0052.

Tiempo asignado: 2,5 horas.

Propuesta: G/2015B/030

Investigador Principal: José Prieto, Universidad Diego Portales

Título: Near Explosion GMOS-South Spectroscopy of ASAS-SN and CHASE Nearby Supernovae

Resumen: There are very few existing spectra in the literature of supernovae obtained shortly after (within 2 days) of their explosion. We propose to obtain GMOS South spectra in rapid ToO mode of 5 bright ($V < 18$ mag) and nearby ($D < 100$ Mpc) supernovae discovered by the All-Sky Automated Supernova Search (ASAS-SN) and the Chilean Automatic Supernova SearCh (CHASE) at these very early phases. Given the excellent cadences of ASAS-SN and CHASE, we are discovering nearby core-collapse and Type Ia SNe close to their explosion times. The GMOS spectra obtained at these very early phases will allow us to probe the fast supernova shock velocities and the composition and ionization conditions of the outer layers of the progenitor star, constraining the physics of the supernova explosion, the progenitor star, and also the CSM environment in both core-collapse and Type Ia supernovae. In addition to the very early observations that we propose to obtain with GMOS of ASAS-SN and CHASE SNe, we will use a range of follow-up facilities to obtain well sampled near-UV/optical/near-IR light curves and optical spectra. These observations will give us a more complete picture of these nearby supernova explosions and will put direct constraints on the progenitors and explosion mechanisms of all SN types.

Tiempo asignado: 3,5 horas.

Propuesta: G/2015B/008

Investigador Principal: Koraljka Muzic, Universidad Diego Mardones

Título: Probing the effects of environment on brown dwarf formation

Resumen: Recent surveys in nearby young star forming regions give intriguing evidence for regional differences in the shape of the Initial Mass Function in the substellar domain. This can be understood as a sign of environmental differences in the formation of very low mass objects, possibly caused by the presence of massive stars, or high stellar densities. In order to further test this hypothesis, we propose to obtain deep FLAMINGOS2 images of two young clusters with significantly different environments than those characterizing most of the nearby star forming regions. The selected clusters are RCW 36, showing high stellar densities, but only a few massive stars, and NGC 2244, a loose cluster harboring many OB stars. By deriving the IMF in these two clusters, and comparing them to the current surveys, we will test the notion that brown dwarf formation is indeed a function of environment. We will also test which of the two conditions, stellar density or presence of the OB stars, has stronger influence at the numbers of young brown dwarfs relative to stars.

Tiempo asignado: 10 horas.

Propuesta: G/2015B/004

Investigador Principal: Claus Tappert, Universidad de Valparaíso

Título: Recovery of old novae

Resumen: A nova eruption is a thermonuclear runaway on the surface of the white dwarf in a cataclysmic variable (CV). This is assumed to be a recurrent event, and CVs thus represent novae in-between eruptions. A few decades after the nova eruption, the characteristics of the underlying CV become dominant. Population studies of post-novae would therefore provide observational information on the importance of certain properties (magnetic field, mass-transfer rate, etc.) for the CV to undergo a nova eruption, as well as the impact of the eruption on those parameters. However, such research is severely limited by our incomplete knowledge of post-novae and their properties. The main reason is that still a large part of the Galactic novae lack identification of the post-nova system. We here propose to continue our program on unveiling the post-nova population by confirming selected candidates by the means of long-slit spectroscopy.

Tiempo asignado: 10,5 horas.

Propuesta: G/2015B/035

Investigador Principal: Valentin Christiaens, Universidad de Chile

Título: Planets in the transition disk of Herbig AeBe stars

Resumen: Observations of accreting protoplanets are required to constrain theories of planet formation and its feedback onto disk evolution. Recent progress suggests that core-accretion could occur efficiently in the outer regions of disks hosting large gaps. Such gaps are thought to be sculpted by massive giant planets. New hydrodynamical simulations including radiative planet formation feedback suggest that circumplanetary material is heated to ~ 200 K by the release of gravitational energy, which may explain the bright compact signal seen at a large separation in HD 169142.

GPI allows state-of-the-art imaging of large protoplanetary cavities, and the detection of these long-sought protoplanets near the gaps' edges or in the outer disks. We will search for planetary companions in direct imaging with reference-star differential imaging in two carefully selected transition disks. Detections will be interpreted in terms of our proposed positive feedback mechanism. Polarimetric differential imaging will provide images of the protoplanetary gaps and test the occurrence of shadows, spirals and asymmetries.

Tiempo asignado: 2,8 horas.

Propuesta: G/2015B/013

Investigador Principal: Doug Geisler, Universidad de Concepción

Título: Accurate Ages, Metal Abundances and Kinematics of a Large Sample of Small Magellanic Cloud Star Clusters and Surrounding Fields

Resumen: We propose to derive ages, metallicities and velocities, for red giants in 10 star clusters in the Small Magellanic Cloud (SMC). Simultaneously, we will obtain similar data (except for ages) for a number of field stars surrounding each cluster. The Ca triplet efficiently yields excellent velocities and metallicities, and CMDs from preimages provide ages. SMC clusters are an ideal laboratory for unlocking the secrets of cluster and galaxy formation, and are crucial testbeds for stellar evolution models and interpreting the integrated light of distant galaxies. Despite its proximity, we still lack a comprehensive knowledge of the SMC chemical evolution, which should be greatly aided by this investigation. We will compile a definitive dataset for the age-metallicity relation (AMR), metallicity distribution and possible gradients. Our much larger sample of field giants currently available permits comparison of chemical evolution in clusters to the field. Velocities yield the kinematics of both the clusters and field giants, which are important for understanding the structure and formation of this nearby galaxy.

Tiempo asignado: 7,6 horas.

Propuesta: G/2015B/028

Investigador Principal: Patricia Bessiere, Universidad de Concepción

Título: The evolution of quasar host galaxies

Resumen: The triggering mechanism of AGN remains a matter of hot debate, but it has been suggested that a dichotomy exists in the triggering mechanism for low and high luminosity AGN. Whereas at the upper end of the scale, major gas-rich mergers may be required to trigger the activity, in low luminosity AGN secular processes are deemed sufficient. If this is true, expect to see a strong evolution in their host galaxy stellar populations. We propose to test this idea by obtaining long slit spectroscopy of a complete sample of high luminosity type II quasar objects. Along with data already obtained, this will allow us to investigate any luminosity dependence in the stellar populations of the host galaxies of AGN, across a wide range of AGN luminosities.

Tiempo asignado: 11 horas.
