

Resultados del Concurso 2010A para Observaciones en Gemini-Sur

Propuesta: G/2010A/030

Investigador Principal: Franz Bauer, Pontificia Universidad Católica de Chile.

Título: Probing the Dust Content in SN1996cr.

Resumen: Following the discovery of SN1996cr (3.7 Mpc) as a bright source in Spitzer data, we propose Gemini T-ReCS observations to constrain its dust content and anchor its anticipated evolution. Only a small subset of SNe have been detected in the IR at all, let alone any bright enough for detailed mid-IR constraints. Extensive archival X-ray and radio data suggest that SN1996cr exploded into a cavity formed by its progenitor, a scenario similar to SN1987A but 5x as compact and 1000x more luminous. The IR emission from SN1996cr must be powered by the interaction of the shock with the circumstellar environment, however, the new IRAC and MIPS 24um detections fail to constrain the nature and origin of the dust, which is key to interpretation. The composition, density, temperature, and evolution of the dust have important ramifications for the structure of the emerging SN remnant and progenitor type. In conjunction with ongoing X-ray and radio monitoring, multi-epoch VLBI imaging, and a new 485ks Chandra HETG observation, the proposed T-ReCS spectrum can help leverage our understanding of SN1996cr to its fullest. We stress that sources like SN1987A and SN1996cr have profound implications for our understanding of the dust production and destruction mechanisms which ultimately affect galactic enrichment.

Tiempo asignado: 4,8

Propuesta: G/2010A/031

Investigador Principal: Sebastian Lopez, Universidad de Chile

Título: Exceptional Swift and Fermi GRBs: Gemini South Targets of Opportunity

Resumen: Swift and Fermi have led a renaissance in the study of GRBs, discovering an unprecedented number of events and promptly alerting the community to accurate localizations. However, it is in the follow-up, particularly at optical/infrared (OIR) wavebands, where the full scientific potential of these missions is realized. We propose to use the OIR instrument suite on both Gemini telescopes in a concerted effort to rapidly observe new GRBs. Our focus is on the extrema and rarities that hold the greatest potential as unique probes of the universe and stellar death: 1) high-redshift events ($z > 6$), offering spectroscopic probes of the universe during reionization, 2) low-redshift events ($z < 1$), allowing searches for and detailed studies of accompanying supernovae, 3) Fermi-LAT bursts, which require redshift measurements in order to constrain theories of quantum gravity and place limits on the Lorentz factor of the outflow and, (4) short GRBs, with the goal of constraining their still-mysterious progenitors. Gemini has emerged as the cornerstone facility of our group's GRB research and we will continue to use our proprietary access on smaller facilities to maximize the return of Gemini observations.

Tiempo asignado: 3,0

Propuesta: G/2010A/029

Investigador Principal: Sebastian Lopez, Universidad de Chile.

Título: Surveying the Post-Reionization Universe with Quasar Spectroscopy

Resumen: We propose to obtain GMOS-S spectroscopy of 14 quasars as part of a long-term endeavour to study the $z > 4.4$ IGM with Gemini (a related 2010A GMOS-N proposal is submitted). Ultimately, our 3-semester program will provide ~ 200 R ~ 850 spectra of $z > 4.4$ quasars, the largest homogeneous sample of science-grade high-redshift quasar spectra in existence. This sample will yield the first statistically meaningful measurements of the neutral gas content, the number density of optically thick

Tiempo asignado: 2,0

Propuesta: G/2010A/015a

Investigador Principal: Mario Hamuy, Universidad de Chile.

Título: Early and late phase spectroscopic study of supernovae in the Local Universe by the Chilean Millennium Center for Supernova Studies

Resumen: In Chile we have founded the Millennium Center for Supernova Science (MCSS) with the purpose of refining methods for extragalactic distance determinations, studying the origin of the dark energy, and gaining a deeper understanding of the physics of these cosmic explosions. A main goal of the MCSS is to secure spectrophotometric observations of supernovae (SNe) at early and late phases. With this proposal we request 24 hours with GMOS. Twelve of these hours are requested as rapid ToO time in order to obtain a detailed time-series of (8-10) optical spectra of one or two young Type I SN discovered by our CHASE SN search, and a very early spectrum of several Type II events. Through

Tiempo asignado: 12, 0

Propuesta: G/2010A/014

Investigador Principal: J. Jenkins, Universidad de Chile.

Título: Imaging companions from the Anglo-Australian Planet Search

Resumen: We propose NICI SDI observations of 30 host stars from the Anglo-Australian Planet Search target list that have displayed the presence of long-period companions, with unresolved periods longer than the current 11 year span of our precision Doppler data. These observations will (1) allow us to determine whether these long-period companions have very long periods (> 20 yr) and high masses (ie. brown dwarf or M-dwarf masses), or shorter periods (11-20yr) and planetary masses; (2) to do so without the inclination "sin i" degeneracy that afflicts Doppler observations; and (3) allow any T- or Y-dwarfs so detected to be targetted for follow-up as benchmark brown dwarf systems of known age and metallicity.

Tiempo asignado: 7,5

Propuesta: G/2010A/028

Investigador Principal: Felipe Barrientos, Pontificia Universidad Católica de Chile

Título: Spectroscopy of Infrared Galaxies in Clusters to $z = 1$

Resumen: We are conducting a multi-wavelength study of a unique sample of galaxy clusters over the redshift range $0.3 < z < 1.1$. A key component of this program is infrared imaging with the Spitzer Space Telescope at 24microns, which is sensitive to dust enshrouded star formation activity and active

Tiempo asignado: 9,0

Propuesta: G/2010A/022

Investigador Principal: Tom Richtler, Universidad de Concepción

Título: Ultra-Compact Dwarfs in the Antlia cluster: searching for answers on their origin

Resumen: While similar in colour to globular clusters (GCs), Ultra Compact Dwarf (UCDs) have properties like mass and size between classical GCs and dwarf elliptical galaxies. UCDs have now been detected in various cluster environments. Several formation scenarios have been proposed for them but their true nature is still far from being understood. This proposal aims at obtaining GMOS spectra for a sample of about 70 UCD candidates in the Antlia cluster. Firstly, we will test their membership (none of the targets has available radial velocity) and build a new list of spectroscopically confirmed UCDs. Then, spectroscopic metallicities and ages will be obtained by means of line strength indices and/or spectral synthesis, in order to characterize their population(s) properties. Finally, the sample will also serve to address the internal dynamics of UCDs via future high-dispersion studies. Four GMOS MOS fields are now requested, which are located close to the two dominant Antlia galaxies. Moreover, dwarf galaxies and GC candidates present in the fields will be included in the masks. The proposed investigation is planned as part of the future Doctoral Thesis of the student J.P. Caso, who has performed the photometric selection of the UCD candidates as part of his Master Thesis.

Tiempo asignado: 6.0

Propuesta: G/2010A/015b

Investigador Principal: Mario Hamuy, Universidad de Chile

Título: Early and late phase spectroscopic study of supernovae in the Local Universe by the Chilean Millennium Center for Supernova Studies

Resumen: In Chile we have founded the Millennium Center for Supernova Science (MCSS) with the purpose of refining methods for extragalactic distance determinations, studying the origin of the dark energy, and gaining a deeper understanding of the physics of these cosmic explosions. A main goal of the MCSS is to secure spectrophotometric observations of supernovae (SNe) at early and late phases. With this proposal we request 24 hours with GMOS. Twelve of these hours are requested as rapid ToO time in order to obtain a detailed time-series of (8-10) optical spectra of one or two young Type I SN discovered by our CHASE SN search, and a very early spectrum of several Type II events. Through

Tiempo asignado: 12,0

Propuesta: G/2010A/012

Investigador Principal: Manuela Zoccali, Pontificia Universidad Católica de Chile

Título: Multiple Stellar Populations in the Globular Cluster M22: a study of C+N+O abundances.

Resumen: We propose to acquire high resolution infrared spectra for 10 Red Giant Branch stars in the Globular Cluster (GC) NGC 6656 (M22) in order to study the total C+N+O abundances in the context of the multiple stellar populations scenario in GCs. M22 represents an interesting target: it is among the GCs showing a split Sub Giant Branch (Piotto 2009), and hosts two stellar groups with different s-process elements, and unexpected variations in iron and calcium (Marino et al. 2009). Very interestingly this chemical pattern resembles the case of Omega Centauri, always considered the relict of a dwarf galaxy cannibalized by the Milky Way, rather than a real GC. A study of the C+N+O content and its relation with s-process elements and iron, will help us to shed light on the origin of the different stellar populations in M22, since possible variations in CNO, should indicate the presence of a second generation of stars formed in a medium enriched by stellar winds, and also account for the split SGB.

Tiempo asignado: 12, 0

Propuesta: G/2010A/018

Investigador Principal: Sergio Hoyer, Universidad de Chile

Título: Search for unseen companions around 4 transiting planets using Transit Timing Variations.(IV)

Resumen: More than 60 exoplanets have been discovered to transit their parent star. This configuration provides the only means to accurately measure orbital inclination and planetary radii, to later infer mass and density, critical parameters to constrain the models necessary to understand the physics of exoplanetary interiors and their evolution. To this date, searches of exoplanets by transit have only detected gaseous giant planets, i.e., Hot Jupiters. But it has been further realized that the analysis of the light curves of these transiting planets can be use for the detection of planetary companions. In particular the presence of variations in the timing of transits (TTVs) can be attributed to the presence of otherwise undetectable Earth-like planets in the system. We propose to monitor transit events for OGLE planet candidates. Parameters obtained from these transit events, together with those derived by data being obtained during semester 2008b, 2009a, 2009b and those available in the literature, will allow to search for variations in the timing of the central transit, potentially discovering yet unseen low-mass companions.

Tiempo asignado: 9, 0

Propuesta: G/2010A/018b3

Investigador Principal: Sergio Hoyer, Universidad de Chile

Título: Search for unseen companions around 4 transiting planets using Transit Timing Variations.(IV)

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Tiempo asignado: 10, 0

Propuesta: G/2010A/006

Investigador Principal: Verónica Motta, Universidad de Valparaíso

Título: The innermost density profile of dark matter halos in galaxy groups

Resumen: We propose to probe the inner slope of the dark matter density profile in groups of galaxies, combining strong lensing modeling and dynamical studies. We have selected a sample of seven lensing groups from CFHTLS deep images (SL2S), which span a significant range of lens redshifts as well as group complexity. We will use the GMOS instrument in long-slit spectroscopic mode to measure the redshifts of the lensed sources. We will used our data to constrain the group mass profiles with

Tiempo asignado: 10, 5

Propuesta: G/2010A/017

Investigador Principal: Sandro Villanova, Universidad de Concepción

Título: Chemical abundances of C, N, and F in M4 giant stars: The origin of the multipopulations in Globular Clusters

Resumen: Globular Clusters are known to have spread in their light element content affecting their stellar population. They show correlation or anticorrelations (i.e. Na vs. O) patterns more or less extended, that are due to the presence of multiple stellar populations, with the younger ones formed from the interstellar medium polluted by the stars that were born first (the so called self-enrichment scenario). Polluters were suggested to be AGB or fast rotating stars. Recently we presented an abundance

Tiempo asignado: 20, 0

Propuesta: G/2010A/013

Investigador Principal: Michel Cure, Universidad de Valparaíso.

Título: Origin and formation of circumstellar disks around B[e] supergiants

Resumen: Our aim is to study the underlying mechanism originating the B[e] phenomenon and investigate the geometry, physical structure and evolution of the circumstellar envelope of two B[e] supergiants: HDE 327083 and CPD-52 9243. In this context, high quality and high resolution IR spectroscopic data are of great importance to test models of stellar winds and set constraints to the size and geometry of the surrounding material. A kinematical study of the equatorial disk/wind material will

Tiempo asignado: 3, 0

Propuesta: G/2010A/019

Investigador Principal: Jose Gallardo, Universidad de Chile

Título: High resolution near-IR spectroscopic characterization of post-common envelope low mass companions among nearby WDs

Resumen: We propose a combined theoretical-observational study of 3 (three) unresolved post common envelope (PCE) low mass stars in very close orbits (<0.1 AU) around nearby white dwarfs (WDs) to test specific predictions of the common envelope evolutionary phase. It is widely accepted that during the main sequence evolution of the WD progenitors (around 2.0 solar masses), the isotopic ratio of the CNO elements change in the center of the star as CNO tri-cycle develops. In particular main sequence star has a ratio of $^{12}\text{C}/^{13}\text{C} = 84$, but as the evolution continues, when the star evolves to the red giant or supergiant this ratio drastically change due to convective mixing of the inner and outer region of the star, i.e., $^{12}\text{C}/^{13}\text{C} = 17$. The dwarf companion may accrete some part of this material during this so called "common envelope phase", altering drastically the ^{12}C - ^{13}C ratio on the less massive companion. In particular, we plan to observe these system at IR wavelength range with PHOENIX high resolution spectra ($R=50\,000$), where we are able to study this contamination using specifically the CO bands, and then comparing these observations with high resolution models calculated by the atmospheric transfer radiative code PHOENIX for different ^{12}C versus ^{13}C ratio configurations provide us informations about the structure of the common envelope and its evolution

Tiempo asignado: 5, 5

Propuesta: G/2010A/024

Investigador Principal: Luis Vega Neme, Universidad de Valparaíso.

Título: Unveiling the nature of Blue Compact Dwarf galaxies with IFU

Resumen: The main goal of this proposal is to get IFU spectra of two Blue Compact Dwarf galaxies. We aim at characterizing their composite stellar populations, internal kinematic and chemical composition, in order to bring light to some open questions related with the origine of BCDs and that of their high star formation rates. Up to date, only 4 BCDs or HII galaxies have been observed with IFU (He 2-10, Marquart et al. 2007; Mrk996, James et al. 2009; UM 408, Lagos et al. 2009; Zw 40, Bordalo et al. 2009), despite the hughe potential of this instrument to obtain spectroscopic data with high spatial resolution. Here we focus on four systems placed in low density regions of the Virgo cluster (i.e. Tol 35, Tol 65, Tol 85 and UM 452). Despite there are photometric studies of these galaxies, a detailed spectroscopic analysis is still lacking. Such analysis will be interesting in the light of a potential comparison of some properties with other BCD galaxies belonging to Virgo and observed with Gemini-Gmos (Vaduvescu et al. 2007). There is a joint proposal sent to Gemini South to obtain IFU data of two additional systems. It is planned to increase our sample of BCD galaxies observed with IFU in the following semesters. Our long term project aims at identifying common features of isolated systems, contributing to a more exhaustive understanding of these exciting objects.

Tiempo asignado: 6, 7
