

Resultados del Concurso 2006A para Observaciones en Gemini-Sur

Propuesta: GS-2006A-C-1

Investigador Principal: Dr. Simon Casassus (UCH)

Título: "Constraints on sources of extinct radionuclide ^{26}Al from the hyperfine splitting of [AlVI] 3.6 μm in PNe"

Resumen: The 1.8MeV gamma-ray emission due to the decay of ^{26}Al into ^{26}Mg has been the object of extensive surveys: with a halflife of 1Myr, ^{26}Al is a signpost of recent nucleosynthesis. But its origin remains elusive. The $^{26}\text{Al}/^{27}\text{Al}$ ratio has never been measured in any astrophysical source.

Our recently published spectrum of [AlVI] 3.6 μm in the high-excitation planetary nebula NGC6302, obtained with Phoenix on Gemini-South, resolve the hyperfine splitting allowing us to estimate the aluminium isotopic ratio. There are five hyperfine components, due to the coupling of the $I=5/2$ nuclear spin of ^{27}Al with the total electronic angular momentum J . Unstable ^{26}Al has a nuclear spin of $I=5$, and a different hyperfine structure than ^{27}Al . We have modelled the line profiles to obtain $^{26}\text{Al}/^{27}\text{Al} < 3.3\%$, the most stringent limit to date, but short of constraining AGB models which predict $^{26}\text{Al}/^{27}\text{Al} = 1.3\%$ for NGC6302.

We request deeper observations of [AlVI] in NGC6302 to reach the predicted level of ^{26}Al .

Tiempo asignado: 40 horas

Propuesta: GS-2006A-Q-6

Investigador Principal: Dr. Neil Nagar (UdC)

Título: "Probing The Environment of Gamma Rays Bursts in the Era of Rapid Followup "

Resumen: Gamma Ray Bursts are the most luminous and transient object in the Universe and represent the most significant new astrophysical phenomenon since the discovery of quasars and pulsars. In the era of rapid response followups to alerts from new gamma-X satellites such as Swift, we propose to acquire spectra of high-redshift, short or spectrally-distorted GRBs driven by the results of quality prompt robotic observations performed with our fully-automated 2-m class telescopes. Our primary goals are to use the optical/IR light from the GRB counterpart as a time-variable background illuminating source to study the ISM in high redshift (and intervening) galaxies, determine the physical properties of the circum-burst medium and the burst energetics. In the event of the discovery of an optical/IR counterpart to a short-GRB by our robots, we propose to activate a multicolor imaging sequence on Gemini South (GMOS) with the goal of determining for the first time whether the origin of short bursts is extragalactic and whether they occur in distant galaxies.

Tiempo asignado: 6 horas

Propuesta: GS-2006A-Q-66 (conjunta con AR)

Investigador Principal: Dr. Aaron Romanowsky (UdC)

Título: " Dark matter lost or found? - the dynamical portrait of an ordinary disk elliptical galaxy "

Resumen: Planetary nebula (PN) kinematics in ordinary elliptical galaxies show surprisingly little evidence of dark matter. Theorists are busy trying to explain this result, but observationally, there are avenues which should be pursued, including determining the kinematics of globular clusters (GCs), which provide independent mass constraints. We propose using GMOS-South to acquire spectra of ~200 GCs around the flattened elliptical NGC 4697, which is one of the "low-dark matter" galaxies. The complementary data include optical imaging (optimized for identifying GCs), kinematics of PNe, and X-ray emission. We will cross-check the PN, GC, and X-ray mass results, and if consistent, combine them for stronger constraints. The dynamical properties of the GC system (rotation, orbit types, etc.) will also be very useful as a diagnostic of the galaxy formation history.

Tiempo asignado: 14,8 horas

Propuesta: GS-2006A-Q-41 (conjunta con BR)

Investigador Principal: Dra. Manuela Zoccali (PUC)

Título: "Spectra of bulge stars with known abundance ratios for population synthesis applications"

Resumen: We intend to obtain spectra of bulge stars, at low resolution ($\Delta\lambda = 6 \text{ \AA}$), for population synthesis applications. Our sample stars were already observed with VLT-FLAMES, therefore we have spectra for all this sample, covering the wavelength range 6100-6800 \AA , for which we are in the process of deriving Iron abundances, as well as enhancements of alpha elements, and abundances of s- and r-elements. Therefore the abundance pattern of the sample stars will be known. The VLT-FLAMES spectra, taken in portions of 300 \AA , and total coverage of 700 \AA , are used to derive abundances, and do not have spectral coverage enough for populations synthesis work.

We have coordinates for 200 stars in the field, with astrometric accuracy $<0.3 \text{ arcsec}$.

This library of bulge spectra will be implemented in the code by Bruzual & Charlot (2003), as well as our synthetic library that is already implemented in their code. It will be made available to any interested users. Our ultimate goal is to derive abundance ratios from integrated spectra of elliptical galaxies.

Tiempo asignado: 0,9 horas

Propuesta: GS-2006A-Q-54

Investigador Principal: Dr. Leopoldo Infante (PUC)

Título: "A Search for Emission-Line Signature of $z > 7$ Galaxy Candidates in the Fields of Lensed Clusters"

Resumen: We propose to carry out spectroscopic observations of six z-band dropout candidates selected from our deep infrared and HST/ACS imaging of 14 clusters. They are, at J-band AB magnitude of ~ 24 , brighter than those in the GOODS and UDF, but may be amplified by the lensing effect of the foreground cluster. With moderate exposures (4 hr each) using GNIRS we will be able to detect emission lines to half as bright as the weakest measured in high-z galaxies to date. If the Ly-alpha emission line exhibit an equivalent width similar to that in $z \sim 6$ galaxies, we will be able to study its profile as insight to the reionization status of the intergalactic medium as well as the star formation rate at $z > 7$.

Tiempo asignado: 15 horas

Propuesta: GS-2006A-Q-59

Investigador Principal: Dr. Sebastián López (UCh)

Título: " An Integral Field Unit Search of Gas-rich Starforming Galaxies at $z > 2$ "

Resumen: Damped Lyman-alpha absorption systems (DLAs) contain roughly enough neutral gas at redshift $z = 3.5$ to form the bulk of the stars in present-day galaxies. Recent studies also suggest that these systems contribute an equal amount of star formation rate density at $z \sim 3$ as the starburst population selected by their luminous ultraviolet fluxes. However, little is known regarding the physical properties of the absorbing galaxies at high redshifts. In this CH/US joint proposal we propose to conduct a novel search of DLA galaxies using the Integral Field Units (IFU) in GMOS South and North. The IFU allows us to search for Ly-alpha emission from DLA galaxies at small angular distances to the sightline without prior knowledge of the impact orientation of the absorbing galaxies. It serves as a tunable narrow-band filter which, when centered at the known DLA trough, removes the glare of the background QSO. The IFU therefore offers a higher efficiency than traditional imaging/spectroscopic surveys of DLA galaxies. The scientific objectives of the project are (1) to examine the morphologies and impact geometry of DLA galaxies using the 2D emission-line features reconstructed from individual IFU elements, and (2) to obtain measurements (or upper limits) of the star formation rates of these galaxies based on emission-line strengths and compare with known properties of field galaxies at the same epoch.

Tiempo asignado: 10,5 horas

Propuesta: GS-2006A-C-9 (conjunta con BR,AU)

Investigador Principal: Dra. Manuela Zoccali (PUC)

Título: "Chemical Abundances in Metal-poor Globular Clusters of the Galactic Bulge"

Resumen: The Galactic bulge is the least studied stellar population in our Galaxy. Very little data is available in terms of its detailed abundance pattern which could give important information on the formation and chemical enrichment of the bulge. It is predicted that, if dissipational collapse occurred in the early Galaxy, the metal-poor bulge stars and globular clusters were among the very first objects which formed. We intend to observe 20 red giants in the metal-poor bulge globular clusters HP-1 and NGC 6558 using the Phoenix IR spectrograph.

We have V and I colours obtained for these clusters with the ESO NTT and WFI@2.2m telescopes. The present proposal is a resubmission of previously granted time, but only 2 hours of the approved 2 nights in classical time, were useful. In these 2 hours in June 2005 we were able to observe 2 HP-1 stars using Phoenix at Gemini, and the spectra are excellent. The IR is ideal for the purpose given the low impact of reddening and the small amount of line-crowding in the stellar spectra, which allow the measurement of very accurate element abundances. The very scarce abundance information available for metal-poor bulge stars to date suggest significant differences with the halo population of similar metallicity for unknown reasons, which we intend to investigate. The proposed observations will enable the determination of the abundances of oxygen using the OH lines, that is the main purpose of this proposal, besides C, N, Fe and the alpha-element Ti, which will provide important insight to the nucleosynthetic enrichment during the earliest phases of our Galaxy.

Tiempo asignado: 5 horas

Propuesta: GS-2006A-Q-58

Investigador Principal: Dra. Paulina Lira (UCh)

Título: " Black-hole mass and growth rate at high redshift"

Resumen: Studies show that high- z , high-luminosity quasars present much larger accretion rates ($M_{\dot{}}$) than those found at lower redshifts ($z < 2$). However, these studies have so far only probed systems with large black hole masses (M) and might give a biased picture of the growth and evolution of massive black holes (BH). Intermediate-luminosity systems could be less energetic because they have smaller BH-masses and/or lower accretion rates, a question with far reaching implications for the early evolution of BHs and their hosts. Our aim is to measure M and $M_{\dot{}}$ for a large number of high- z quasars going down in the quasar luminosity function, thus probing an unknown regime. We started this programme in 2005A and obtained data for 7 $z \sim 3.4$ quasars during that semestre. In 2005B we were awarded time to complete the $z \sim 3.4$ sample and to start the observations of $z \sim 2.4$ quasars. Here we wish to complete a total sample of 15 $z \sim 2.4$ objects during 2006A. The final compilation of this data set will enable us to determine the BH-mass growth rate in two redshift bands and test whether all systems, with large and small BH mass, grew faster at earlier times.

Tiempo asignado: 17 horas