

Resultados del Concurso 2007A para Observaciones en Gemini-Sur

Propuesta: GS-2007A-Q- 132

Investigador Principal: Dr. Simón Casassus (UCH)

Título: " Identifying the nature of the centimetre-wave excess in selected planetary nebulae"

Resumen: *Experiments designed to map the CMB have discovered a 100um-correlated diffuse centimetre-wave (20-30GHz) foreground. The dust-correlated radio signal has been interpreted as electric dipole radiation from very small dust grains (VSGs) spinning at GHz frequencies, or spinning dust. Excess emission over known emission mechanisms has also been observed in specific objects: dark clouds, HII regions and planetary nebulae (PNe). A morphological comparison of VLA and T-ReCS observations will provide an independent test on the spectral evidence for the cm-wave excess in PNe. We propose to obtain template images for the distribution of VSGs in four selected compact PNe. T-ReCS+NB 11.3um images will trace the VSGs both through the PAH band and/or the underlying continuum.*

Tiempo asignado: 11.5 horas

Propuesta: GS-2007A-Q-136(Conjunta con AR,UK,US)

Investigador Principal: Dr.Aaron Romanowsky(UDEC)

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

Resumen: *Planetary nebula (PN) kinematics in ordinary elliptical galaxies show surprisingly little evidence of dark matter. This result is highly controversial, and it is crucial to confirm it with independent mass constraints, e.g. via the kinematics of globular clusters (GCs). The galaxy NGC 4697 is a prime candidate for such a check, as it is a nearby flattened "low dark matter" elliptical with a large GC population. Our previous GMOS proposal on GC kinematics in this galaxy was only half completed, but we still managed to acquire ~100 velocities, which intriguingly do support the PN result of low dark matter content. Our data set is not extensive enough yet for definitive results, so we propose to continue the program, acquiring another ~100 GC velocities around NGC 4697, with an extension to much larger radii. We will combine all of the galaxy's available data (stars, PNe, GCs, X-ray) to tightly constrain its distribution of dark matter. The dynamical properties of the GC system (rotation, orbit types, LMXB connections) will also be useful as a diagnostic of the galaxy formation history.*

Tiempo asignado: 6,8 horas

Propuesta: GS-2007A-Q-137

Investigador Principal: Dr. Hernán Quintana (PUC)

Título: "Studying Cosmic Evolution with the First $z>1$ X-ray Luminous Galaxy Clusters with SZE Survey

Coverage"

Resumen: *Distant galaxy clusters are important probes to trace the growth of cosmic structure and to study galaxy and intergalactic medium evolution. We have systematically found such cluster targets in deep archival XMM-Newton observations with the help of optical/NIR photometric identification yielding 5 new spectroscopically confirmed discoveries with redshifts from 0.95 to 1.45 up to date. Here we propose to spectroscopically confirm a first sample of 4 $z > 1$ cluster candidates in the South Pole Telescope (SPT) region, selected from a designated follow-up campaign of X-ray clusters with joint SZE survey coverage. This sample will allow (i) direct tests of the SPT selection function at high redshift, and (ii) a first joint X-ray - SZE - optical/NIR analyses at $z > 1$. In addition, the significant increase in the the number of known X-ray clusters above redshift one will enable immediate studies of current issues in observational cosmology: (iii) trace the age of the cluster galaxy population in comparison to the field, (iv) study the early heavy element enrichment and the star formation feedback heating of the intracluster medium, and (v) test if the structure evolution of clusters is consistent with current theoretical models.*

Tiempo asignado: 16.8 horas

Propuesta: GS-2007A-Q-138(Conjunta con CA)

Investigador Principal: Dr.Doug Geisler (UDEC)

Título: "The Definitive Age and Metallicity Distributions of Globular Clusters in the Nearest Giant Elliptical Galaxy, NGC 5128"

Resumen: *Globular cluster (GC) formation accompanies major star formation episodes so the age and metallicity distributions of the GCs in a giant E galaxy (gE) provide one of the clearest signatures of the galaxy's formation and chemical evolution history. As by far the nearest gE, NGC 5128 provides a truly unique opportunity to use GCs to study the assembly history of a gE. However, such a study is very observationally demanding, requiring large numbers of GCs with exquisite spectra in order to overcome the age-metallicity degeneracy which plagues such studies. We propose to continue our definitive spectroscopic study using GMOS to obtain very high S/N spectra of ~ 100 of its brighter GCs. These will be used to derive Lick/IDS spectral indices. We will use a new technique which combines both photometry (already in hand) with these indices to derive simultaneous metallicity, α/Fe and age measurements which provides the best constraints on these parameters. An additional key new aspect of our study is the recent availability of 0.45" images which yield a large number of excellent new GC candidates. We will obtain spectra for both known GCs, which previously had only low S/N spectra, as well as for our best new candidates. With sufficiently high S/N, we should be able to distinguish relative ages to ± 2 Gyr even for the oldest clusters, a feat that is demanded in order to truly constrain galaxy formation scenarios and is only possible for this GC system. We will also derive excellent $[\text{Fe}/\text{H}]$ and α/Fe values, allowing us to check possible trimodality, firmly establish the color-metallicity relationship and examine the nature of the 'blue hook'.*

Tiempo asignado: 8.9 horas

Propuesta: GS-2007A-Q-139

Investigador Principal: Dr.Yen-Ting Lin (PUC)

Título: "Unveiling the Nature of the BzK-Selected Galaxies at $z > 2$ "

Resumen: *Recent technological and methodological advances have opened the window to the "redshift desert"*

($1.4 < z < 2.5$), and discovered several populations (BzK, DRG, BX/BM, ERO) that may represent the progenitors of the present-day early-type galaxies that host the majority of the stars in the local Universe. Understanding the differences in these populations will help refine the selection techniques and point to a unbiased way to probe the $z > 2$ Universe, a key epoch believed to be the period of the formation of the large spheroid systems. As theories are tuned to reproduce the properties of galaxies at $z \sim 0$, data at $z > 2$ have the great power to single out the

physical processes relevant to galaxy formation. We propose to obtain GNIRS spectrum in 37.5 hours for 15 bright ($K=18.9-19.9$, AB mag) BzK-selected galaxies at $z>2$ detected in the MUSYC survey. This new sample will double the number of spectroscopically-confirmed BzK-selected galaxies at $2<z<2.5$, representing an important step towards a complete picture of the massive galaxy formation. The targets are selected from the MUSYC Wide NIR Survey, which has discovered the most BzK galaxies to-date. The photometric redshift technique has allowed pre-selection of candidate galaxies at $z>2$. The combination of the broadband color (UBVRIz'K) and rest-frame optical spectrum will enable us to reliably determine the stellar mass, the star formation rate (SFR), the level of extinction, and the metallicity for the proposed sample, through direct line measurements and SED fitting. An improved knowledge on dust extinction at $z>2$ will allow a fairer comparison with the predictions of theoretical models. While the stellar mass encodes the mass assembly/star formation history of the massive galaxies, the SFR and metallicity are crucial in revealing the efficiency in converting baryons into stars. Furthermore, the spectroscopic redshifts derived from the galaxies will be critical to calibrate the photometric redshifts, which are not yet reliable in the $z=1.5-2.5$ range. Finally, by targeting both star-forming and passive galaxies we will examine the reliability of separating these two populations of the BzK technique. Our proposed observations will complement the other K-selected $z>2$ sample detected by MUSYC (Kriek et al 2006). The combined large sample will enable statistical comparisons with other galaxy samples in the high- z galaxy population zoo.

Tiempo asignado: 37.5 Horas

Propuesta: GS-2007A-Q-140

Investigador Principal: Dr.Leopoldo Infante(PUC)

Título: Spectroscopy of $z>7$ Galaxy Candidates in the Fields of Lensed Clusters

Resumen: We propose to carry out spectroscopic observations of two top candidates of z -band "dropouts" selected from our deep infrared and HST/ACS imaging of 14 clusters. They are, at J-band AB magnitude of ~ 24 , considerably brighter than those in the GOODS and UDF, but may be amplified by the lensing effect of foreground clusters. With long exposures (12 hr each) using GNIRS, we may 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 exhibits 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: 24 horas

Propuesta: GS-2007A-Q-142

Investigador Principal: Dr.Sebastián López (UCH)

Título: "Rapid Spectroscopy and Imaging Follow-up of gamma-Ray Burst Afterglows on the Gemini Telescopes"

Resumen: Though the emergent diversity in the progenitors of Gamma-ray Bursts (GRBs) is of pressing interest, the elusive nature of the phenomena makes the detailed study of the physical origin of the trigger particularly challenging. The Swift satellite, now more than one year into operation, has revolutionized the field by providing unprecedented real-time localization rates and accuracies of the full suite of burst subclasses: long-duration and short-duration GRBs and X-ray Flashes. The rapid localizations allow us to go beyond a simple redshift measurement for each burst to conduct extensive imaging and spectroscopic observations. In addition, the GRB afterglows prove to be a versatile and unique astrophysical probe for studying the ISM of distant galaxies, the IGM at $z>2$, and into the reionization epoch. Here we propose a wide-reaching Target-of-Opportunity program on the Gemini Telescopes --- using both the imaging and spectroscopic capabilities at infrared and optical wavelengths --- in concert with our existing rapid response programs on small-aperture facilities for a comprehensive study of new Swift bursts in the 2007A semester.

Tiempo asignado: 3.0 horas

Propuesta: GS-2007A-Q-144 (Conjunta con GEMINI STAFF)

Investigador Principal: Dr.Marcio Catelan(PUC)

Título: "Rotation and Flattening of Globular Clusters: NGC 121 "

Resumen: *We wish to establish whether rotation can be a main cause of non-sphericity in globular clusters. The difficulty with studying Galactic clusters is that they are constantly interacting with the strong gravitational potential of the Milky Way, hence it is nearly impossible to distinguish the morphological effects of external forces versus internal ones. What is needed to test the various scenarios of globular cluster flattening is a non-spherical, yet isolated extragalactic globular cluster. In the only such study to date, we found that the ellipticity of the lone globular cluster associated with the low-mass dwarf irregular WLM is NOT a result of rotation. Thus in the one case where external forces could be ruled out, rotation was not the source of flattening. However, is this cluster an anomaly, or is rotation generally not the primary cause of globular cluster flattening? Here we propose to provide insight into this problem by using GMOS-S to study the lone, old globular cluster associated with the Small Magellanic Cloud, NGC 121. The resulting velocity profile will definitely answer the question of whether rotation can be a cause of the extreme flattening that is observed in this fairly isolated globular cluster. Note that this program qualifies as a poor weather proposal as outlined in the CFP. This project was granted time in 2006B, however, no data have been obtained to date.*

Tiempo asignado: 11 horas
