Abstracts Book

1.- Phenomenology of BeXRB transient outbursts in the X-ray domain

Peter Kretschmar — *The BeXRB outburst zoo*

Be X-ray binary outbursts do not always follow a simple scheme. Recent data show a variety of properties, like pre-flares, shifts of the outburst peaks with respect to the periastron, multi-peaked outbursts etc. In this presentation I intend to give an overview of the variety of observed behaviours based mainly on the large data sets available from monitoring instruments, without trying to discuss the detailed behaviour of individual sources.

Biswajit Paul — *Intenisty and energy dependent profiles of transient HMXB pulsars*

We will present complex pulse profile evolution during the outbursts of a set of transient HMXB pulsars. All these sources also show very strong energy dependence of complex pulse profiles. The pulse profiles appear to be double peaked upto 10 keV and have a single peak at higher energy. We find that the energy spectra can be well fitted with a partial covering power-law model with high energy cutoff and an iron fluorescence line emission. The pulse phase resolved spectral analysis shows that the partial covering with high energy cutoff model parameters have significant changes with the pulse phase. We will show that this spectral model naturally explains the complex energy dependence of the pulse profiles.

Ascension Camero-Arranz — *The strange case of A 0535+262 and HD 245770: an X-ray/optical overview*

A 0535+262/HD 245770 is an unpredictable Be/X-ray binary system. Normal X-ray outbursts should take place every orbital period (~111 days), when the compact object interacts with the Be circumstellar disk. However, A 0535+262 shows a peculiar transient behavior with very long periods of quiescence in which the source disappears. A 0535+262 may renew activity directly with a very large event and a series of small outbursts until the X-ray activity stops. Or this source may undergo two consecutive giant X-ray events followed by series of small outbursts of decreasing amplitude, before another giant outburst takes place. In the present work, we will perform a historical tour of this Be/X-ray binary system, including new Optical/X-ray observations, using data from different X-ray missions and optical observatories. Some clues to the not well understood X-behavior of A0535+26 are unveiled with observations of the strong Optical/X-ray correlation observed. The overall picture appears to be a system going through periods when the donor star has minimal circumstellar disk and then a dramatic disk recovery leads to a flare of X-ray emission. Unfortunately, this does not explain the variety of observed behaviors for this system.

Jose Joaquin Rodes — *X-ray spectroscopy with Swift/XRT in BeXRBs*

We present the X-ray spectroscopy study of some Be X-ray binary systems, using data obtained with Swift/XRT. We look for continuum models to describe the data and concentrate on the study of the presence of features in the energy spectrum.

Elisa Nespoli — *Correlated spectral and aperiodic variability in 1A 1118-615*

We present a spectral and timing analysis of the third major outburst of the BeXRB system using RXTE data. Studying the evolution of the spectral and timing parameters through- out the entire outburst will reveal interesting correlations. The aperiodic variability is supposed to arise from a region outside the magnetosphere at R > 10^8 cm, while the emitting region that originates the energy spectra lies in the accretion column, i.e., at distances close to the neutron star surface, namely 10^6−10^7 cm. Our results show for the first time that the two regions are somehow physically connected.

Biswajit Paul — *Quasi Periodic Oscillations in High Magnetic Field Accretion Powered Pulsars*

We will present discovery and detailed analysis of quasi periodic oscillations in several high magnetic field accretion powered pulsars. The QPOs are an indicator of the magnetic field strength of the neutron star. We will discuss results from our investigation of the long term behaviour of QPOs in a few sources.

Matthias Kühnel — *GRO J1008-57: high precision timing and spectral evolution*

The transient high mass X-ray binary GRO J1008-57 underwent an outburst in December 2007, which was recorded by RXTE, Suzaku and Swift. With ~180 mCrab this outburst was the most luminous since the start of the RXTE ASM monitoring in 1996. The system is only visible in X-rays during outbursts, which repeat mostly on the 249 day orbital period of the system.
Due to the relatively short outburst durations of around 15 days, the orbital coverage is quite spars. Hence determining the orbit is challenging. By analysing pulse arrival times of the 2007 lightcurves together with data from an outburst in 2005 recorded by RXTE, we were able to improve the existing orbital parameters.
Since the discovery of GRO J1008-57 in 1993 a cyclotron absorption feature at 88 keV is claimed, which could not be securely confirmed yet. Focusing on the spectral evolution we also found evidence for this possible cyclotron line. Additionally we discovered an absorption like feature at around 22 keV, which is, however, only seen at high luminosities. RXTE will observe the outburst of GRO J1008-57 in April 2011 to clarify its existence.

Colleen Wilson-Hodge — *Two decades in the life of EXO 2030+375*

EXO 2030+375, a 42-s accreting pulsar in a 46-day orbit around a Be star, has undergone a detected outburst at nearly every periastron passage since 1991. It has been monitored with BATSE, RXTE, and Fermi/GBM. We will present preliminary results of long-term monitoring, including a long-term frequency history, long-term pulsed flux measurements, and available long-term optical/ir monitoring results.

Silvia Martínez-Nuñez — *Identifying Be/X systems using INTEGRAL*

Since its launch in 2002, INTEGRAL is observing the hard X-ray sky, scanning regularly the galactic plane. The mission has provided us with a valuable data set of BeX observations. We have analysed the spectra and light curves of every single detection of BeX systems using ISGRI. The goal of this work is to compare the temporal and spectral behaviour of the BeX systems respect to other types of High Mass X-ray Binaries. We will show that BeX systems tend to show harder spectra than those of Supergiant X-ray Binaries and that the use of the statistical normalised variance seems to be a promising tool to identify source type.

Sebastian Müller — *XTE J1946+274: The resurrection of a sleeping X-ray pulsar*

We report on a series of outbursts of the transient X-ray pulsar XTE J1946+274 in the second half of 2010 after nearly one decade of quiescence. Quasi-simultaneous Swift-, RXTE-, and INTEGRAL observations allow us to study the pulse period ephemeris of the neutron star as well as the spectral parameters. We confirm the presence of a cyclotron line at about 35 keV. A strong disagreement between XRT and PCA at about 6-7 keV can be explained by Galactic Ridge Emission in the PCA spectra. Using pulse arrival time analysis we determined the pulse period ephemeris of the neutron star which allows us to do pulse phase resolved spectroscopy.

Dmitry Klochkov — *Flaring activity and pulse-to-pulse variability of EXO 2030+375*

EXO 2030+375 is a Be/X-ray binary showing regular "normal" outburst (every ~46 days). The last giant outburst of the source took place in 2006. Some normal outbursts of the system were occasionally monitored with the INTEGRAL observatory. The data revealed strong quasiperiodic flaring activity in the rising part of an outburst. We present the analysis of the flaring behavior of the source and compare it with similar phenomena observed in the first giant outburst of the source in 1985 and in an normal outburst of A0535+26. We also present the analysis of pulse-to-pulse spectral variability of EXO 2030+375 exhibited by the source during its 2006 giant outburst based on the INTEGRAL and RXTE data.

2.- BeXRBs in external galaxies compared to the Milky Way population

Frank Haberl	*BeXRBs in external galaxies compared to the Milky Way population*
	We know more than 80 Be/X-ray binaries in the Small Magellanic Cloud (SMC), about two dozen in the Large Magellanic Cloud (LMC) and over one hundred in the Milky Way. Given that the mass of the SMC is 50 to 100 times smaller than that of the Milky Way Be/X-ray binaries are extremely abundant in this irregular dwarf galaxy. The large sample allows to investigate their statistical properties and to find interesting cases. In this talk I'll concentrate on the X-ray properties of Be/X-ray Binaries in nearby galaxies and compare the populations in the different galaxies to that in the Milky Way.
Elizabeth Bartlett	*The Search for Be/X-ray Binaries in the Phoenix Dwarf Galaxy*
	We report on the first X-ray observations of the Phoenix Dwarf Galaxy carried out by XMM-Newton. This galaxy shares many common features with the Small Magellanic Cloud (SMC) including its low metallicity and similar epochs of star formation. It has already been shown that the SMC is host to an unusually high number of Be/X-ray binaries. A simple mass comparison with the Milky Way suggests there are ~50 more than we would expect. Population synthesis simulations show that the low metallicity environment of the SMC (z=0.004) cannot account for this number alone. It has been known for some time that the number of high mass X-ray binaries (HMXBs) in a galaxy can be related to the galactic star formation rate. It is currently thought that an increase in star formation, possibly caused by tidal interactions with the Milky Way and/or the Large Magellanic Cloud (LMC) along with the low metallicity of the SMC have given rise to the large number of Be/X-ray binaries. By probing any possible Be/X-ray binaries in Phoenix, we hope to further understand factors that can influence star formation in such diverse environments.
Altan Baykal	*Analysis of RXTE PCA Observations of SMC X-1*
	We will present timing and spectral analysis of RXTE observations of SMC X-1 between 1996 and 2003. From obsevations, we obtain a precise timing solution for the source and resolve first time the eccentricity as 0.00089(6). We also show that frequency derivative shows long and short term fluctuations. From the spectral analysis, we found that all spectral parameters except Hydrogen column density showed no significant variation with X-ray flux. Hydrogen column denisty is found to be higher as X-ray flux gets lower.

Lee Townsend — *A first look at the orbital parameters of Be/X-ray binaries in the Small Magellanic Cloud*

The orbital motion of a neutron star about its optical companion presents a window through which to study the orbital parameters of that binary system. This has been used extensively in the Milky Way to calculate these parameters for several high-mass X-ray binaries (HMXB). Using several years of RXTE PCA data, we derive the orbital parameters of five Be/X-ray binary (BeXRB) systems in the Small Magellanic Cloud (SMC), increasing the number of systems with orbital solutions to six. This sample, although small in comparison to that of the Galaxy, allows us to study the orbits of extra-Galactic BeXRBs for the first time and compare them to what is known in our own Galaxy. Despite the low metallicity in the SMC, we find these systems sit amongst the Galactic distribution of orbital periods and eccentricities, suggesting that metallicity may not play an important role in the evolution of BeXRB systems. A plot of orbital period against eccentricity for both Galactic and SMC systems shows that the supergiant, Be and low eccentricity OB transient systems occupy separate regions of the parameter space; akin to the separated regions on the Corbet diagram. Using a Spearman's rank correlation test, we also find a possible correlation between the two parameters.

Matthew Schurch — *Quasi Periodic Variations in Long Period Be X-ray Binaries*

I shall discuss a recent timing study of two Be X-ray binaries (BeXRBs) found in the Small Magellanic Cloud (SMC). These two long period pulsars (SXP726 and SXP756) show extremely different outburst histories in both their optical and X-ray histories. I shall present timing results based on the OGLE I-band data for these two pulsars spanning approximately 10 years. This analysis has revealed short period quasi-periodic variations (QPV) in both light curves of the order 1-2 weeks. These QPVs are not the orbital periods, but are related to the the passage of the neutron stars through periastron which in turn creates a hot spot or over density in the circumstellar disks surrounding the central Be stars. These are not the first systems to present such variations but they are the longest QPVs to be found in BeXRBs.

Vallia Antoniou — *Tracing the young accreting binary population of the Magellanic Clouds using their star-formation history*

In this work, we study the properties of the overall accreting binary population of the Magellanic Clouds and the connection between star-formation (SF) activity and X-ray binary (XRB) formation and evolution. Understanding of the populations of compact objects and their connection with SF will allow us to investigate channels of XRB formation in a variety of environments and therefore help in studies of the X-ray source populations of star-forming galaxies outside our Local Group, and even enable their use as a SF diagnostic. By using surveys carried out with space-based X-ray and infrared observatories and ground-based telescopes, we address the demographics of the most common type of young XRBs in the two nearest star-forming galaxies. Our program makes use of multiwavelength data sets in order to provide better understanding of the physical parameters which influence the XRB formation rate and evolution, such as the metallicity and the age of the parent stellar populations. At the same time, this program demonstrates in the most explicit way, that recent SF activity can be used as a robust indicator of young XRB formation: in the Small Magellanic Cloud (Z~1/5Zo) high-mass XRBs are observed in regions with SF rate bursts ~25-60 Myr ago, while for the Large Magellanic Cloud (Z~1/3Zo) these populations are concentrated in regions as young as ~10-50 Myr. The similarity of this age with the age of maximum occurrence of the Be phenomenon (~40 Myr) indicates that the presence of a circumstellar decretion disk plays a significant role in the number of observed XRBs in the 10-100 Myr age range.

Tony Bird — *Optical periods in SMC Be/X-ray binaries*

We have carried out a systematic search for periodicities in OGLE II and III data for ~50 Be/X-ray binary systems in the SMC. We are finding evidence for a number of different mechanisms that can give rise to periodic variations, and have developed new metrics to recognise and disentangle stellar pulsations from binary effects. We compare our results with those derived from X-ray measurements.

Andry Rajoelimanana — *Long-term properties of Be/X-ray binaries in the SMC.*

More than 60 High Mass X-ray Binaries (HMXBs) have been detected in the SMC, although its mass is one hundred times smaller than that of the Milky Way. The majority of these HMXBs are Be/X-ray binaries (BeX systems) consisting of an X-ray pulsar orbiting a rapidly rotating Be star in a wide and (often highly) eccentric orbit. We have used the combined light curves from MACHO and OGLE projects to study their long-term temporal properties. All the BeX in our sample display long-term quasi-periodic variations on timescales of ~ 200-3000 d. These superorbital modulations are believed to be related to the formation and depletion of the circumstellar disc around the Be star. The MACHO color of these systems show a loop-like structure in the color-magnitude diagram. In addition, we have also detected many of their optical orbital periodicities, visible as a series of precisely regular outbursts. Furthermore, the amplitude of these periodic outbursts can vary through the long-term superorbital cycle. We will discuss mechanisms which can produce this effect, as well as examining an apparent correlation between these periodicities.

3.- Observations in other wavebands and their implications

M. Virginia McSwain — *Multiwavelength Observations of Be/X-ray Binaries and their Implications*

I will review recent highlights of using multiwavelength observations to study the interactions between Be stars and their compact companions. Optical, infrared, and radio observations provide insight about the mass outflow from the star (the circumstellar disk, stellar winds, and mass transfer streams) that is necessary to understand the overall Be/X-ray binary system.

Pere Blay — *UV view of BeXRBs, WSO-UV and perspectives for the future*

There is little information about BeXRBs systems in the UV bands. UV astronomy can be a key research field to understand observations in other wavelengths, it will cover the gap between optical and X-ray wavelengths. UV spectroscopy can provide vital info about the wind properties and the connection between the polar and equatorial winds. It can also provide information about the interaction of the X-ray emission from the neutron star with the wind structures of the Be star. UV photometry can help to improve the determination of intrinsic parameters and to analyze the photometric variability without contamination from the Be disk. UV data can also provide a more accurate measurement of the local extinction law. WSO-UV will open a new window which will lead to a large amount of new data on BeXRB systems.

Yuuki Moritani	*Drastic Spectroscopic Variability of the Be/X-ray Binary A0535+262/V725 Tau during and after the 2009 Giant Outburst*
	High-dispersion optical spectroscopic observations of the Be/X-ray binary A0535+262/V725 Tau during the giant outburst in November/ December 2009 and after it will be reported. The observed emission line profiles, reflecting the structure of the geometrically thin circumstellar envelope of the Be star (Be disk), was highly asymmetric and the equivalent width of them (e.g. -18 Angstrom for H-alpha and -1.5 Angstrom for He I l5876) were highest for the last five years. These facts indicate that the Be disk were highly perturbed and had a component with higer density and/temperature. The line profiles drastically changed not only during the giant outburst but also after it. We discuss the mechanism of the profile variability.
Jose M. Torrejon	*Physical properties of Be stars in X-ray binaries*
	We present a method to disentangle the circumstellar emission from the photospheric spectra of Be stars in X-ray binaries. It is based on simultaneous spectroscopy and photometry of BeX-ray binaries in the Magellanic clouds and in the Milky Way. It has allowed us to derive important physical parameters of the massive donors, like the distance, and their circumstellar envelopes, their densities and sizes.
Mehtap Özbey Arabaci	*Investigation Of The Photometric and Spectroscopic Variations In Be/X-Ray Binaries*
	In this work we present the results of approximately 6 years (2005-2011) monitoring of several Be stars in Be/X-ray binary systems. The photometric data, obtained by Robotic Optical Transient Experiment (ROTSE IIId), state that Be stars show mainly three different types of variations; i) a long-term variation with a time scale of 3-5 years, ii) a mid-term variation lasting weeks or months, iii) a short term variation occurred in days or hours. Using the archival RXTE/ASM observations, the analogies of the X-ray and the optical light-curves are investigated. We also present the optical spectroscopic observations of these systems, taken with the Russian Turkish 1.5 m Telescope (RTT150), to point out whether any correlation exists with the optical brightness variations.

4.- Be/X systems – routes into fundamental astrophysics

Ingo Kreykenbohm — *Transient outbursts as laboratories of accretion physics*

Monitoring the outburst of transient accreting X-ray pulsars from the onset of the outburst until the very end of outburst reveals a wide variety of behaviour. For example, some spectral properties like the energy of cyclotron resonant scattering features or the shape of the pulse profiles among others depend on luminosity and/or time in some sources while other sources show no such behavior. Also some transient sources exhibit a sudden turn-off at the end of the outburst indicating the onset if the propeller effect. The observation of such distinct behavior allows to draw conclusions on the physics of the accretion process. I will therefore review some behaviors observed in outbursts of transient souces and the implications on the accretion process.

Isabel Caballero — *A 0535+26: cyclotron line evolution during its recent 2011 giant outburst*

The Be/X-ray binary A0535+26 has shown three giant outbursts since 2005, after a long period of quiescence. The giant outbursts in 2005 (~5.2 Crab, 15-50 keV range) and 2009 (~5.6 Crab) could not be observed by most X-ray observatories due to Sun observing constraints. Finally, a giant outburst in February 2011, that reached a flux of ~3.8 Crab, was monitored with INTEGRAL and Swift TOO observations. A0535+26 is a highly magnetized accreting neutron star, with a magnetic field of ~4x10^12 G, derived from the cyclotron lines present in the X-ray spectrum of the source at ~45 and ~100 keV. Cyclotron lines are very powerful tools: not only they provide the only direct way to determine a neutron star's magnetic field, but their dependence on the X-ray luminosity can also be used as a test to probe the accretion theory. For A0535+26 no significant variation of the cyclotron line with the X-ray luminosity has been observed. We will present first results of the INTEGRAL and Swift observations of the recent February 2011 outburst, with a special focus on the cyclotron lines present in the X-ray spectrum of the source. The evolution of the cyclotron line with the luminosity will be studied in detail for the first time during a giant outburst of the source.

Sebastian Drave — *Supergiant fast X-ray transients: a BeXRB conection?*

Supergiant fast X-ray transients (SFXT) are a new class of high mass X-ray binary that have been unveiled over the lifetime of the INTEGRAL mission. They are characterised by rapid X-ray flares from deep quiescence states at luminosities of ~10^32 erg s^-1, exhibiting dynamic ranges of up to 10^5 on timescales of minutes to hours. Since these systems were first characterised our understanding has developed at a rapid pace. Here we present two recent results from INTEGRAL and RXTE data and place them in the context of our knowledge of the class as a whole. As a result we consider the interpretation that SFXTs bridge the gap between the classic wind-fed SgXRB and BeXRB members of the HMXB family.

Alexander Lutovinov	*V0332+53 - the natural laboratory on the study of physical conditions and geometry of Be binary systems*
	We present results of the comprehensive spectral and timing analysis of the transient X-ray pulsar V0332+53, which can be considered as a classical example of the Be binary system. Strong variations at different time scales of parameters of the continuum, iron and cyclotron lines were revealed in a wide dynamical luminosity range. We also searched and studied for the first time correlations between different spectral parameters as well as the ratio of the energies of cyclotron harmonics with the luminosity and pulse-phase. Based on the obtained results we proposed and debated theoretical models, including the emission of the accretion columns, reflection, distribution of the matter in the binary system, etc.
Malcolm Coe	*Nature or Nurture - neutron stars in Be/X-ray binaries*
	The population of Be/X-ray binaries in the Small Magellanic Cloud is proving a superb, homogeneous sample of this type of HMXBs. They are all at the same distance, the same extinction and probably born around the same time. As such we can use this sample of over 50 systems to explore evolution and accretion processes in these systems.
Pablo Reig	*Observational evidence for the interaction between the neutron star and the equatorial disk in BeX*
	Be stars may have a lonely, boring and isolated life or a lively, exciting life if they are part of a binary system. In the latter case great fun happens when the companion is a neutron star. In principle, the physical properties of an isolated Be star are the same as that in a BeX. However, it is obvious that the presence of a second body (the neutron star) must have some effect on the observational properties of the system. As the equatorial disc is more exposed to the action of the neutron star, we would expect to see different properties in the discs of isolated Be compared to those of BeX. I will present the observational evidence that supports the existence of an interaction between the neutron star and the circumstellar disc, the most prominent consequence of this interaction being the truncation of the disc.
Sergey Tsygankov	*Power spectra of transient X-ray pulsars: determination of the neutron stars magnetic field*
	We report the results of studies of power density spectra (PDS) of X-ray flux variability in accreting X-ray pulsars. PDS of X-ray pulsars fed from an accretion disk have a distinct break/cutoff at the neutron star spin frequency in the case of corotation. This break is a manifestation of the transition from the disk to the magnetospheric flow at the frequency characteristic of the accretion disk truncation radius (magnetospheric radius). Suggesting that the PDS break frequency is directly related to the magnetospheric radius for a given value of the mass accretion rate, the method for estimate the magnetic moment of accreting compact stars is proposed.

5.- Be stars, Be disks & models in the context of explaining the BeXRB phenomenon

Atsuo Okazaki — *Be stars, Be disks & models in the context of explaining the BeXRB phenomenon*

I start this review by summarizing key observational features of Be stars and their circumstellar disks. Then, I describe a scenario that a Be disk is formed by viscous diffusion of matter ejected from the equatorial surface of the central star. I first apply this viscous decretion disk scenario to Be disks around isolated Be stars and show that the resulting disk structure and dynamics explain many of the key observational features. Then, I apply the model to Be disks in binaries, in particular emphasis on Be/X-ray binaries, where the effect of the companion has to be taken into account. After showing that Be disks in such binaries are likely truncated by tidal/resonant torques by the companion, I compare the results from such a truncated disk model with observed BeXRB phenomenon.

John Richard Jones — *Accretion delay in HMXRB's*

Using a Smoothed Particle Hydrodynamics code developed by Benz(1990) , Bate(1996) and modified for accretion/decretion discs Okazaki(2000), numerous simulations were run of a high mass X-ray binary system. In a set of runs where the period only was varied the data produced shows that the peak accretion rate occurs just after periastron and that the amount of delay depends on the period of the system. The longer the period the longer the delay. In a set of different runs where the eccentricity only was varied the delay after periastron was seen to vary according to the eccentricity, the higher e the longer the delay (e=0.0 circle). Furthermore the data produced shows that for high eccentricity (e=0.9) a double accretion peak is produced. Column density plots of the decretion disc in various runs of the program have shown that there is a density inhomogeneity at the inner radius of the disc. This region covers approx one fifth of the inner radius of the disc and remains in this position throughout numerous orbits of the neutron star. The position of this density inhomogeneity is not perturbed by the neutron star and the resulting spiral density wave over a timescales of 20-60 orbits. These points are presented and discussed in light of observations and knowledge of known systems.

Timothy Linden	*A binary evolution approach to understanding the BeXRB phenomenon*
	Numerical advances have allowed for detailed simulations of the evolution for a galactic population of binary stellar systems – providing us with detailed information regarding both the stellar and binary properties of evolved XRBs. We employ these methods in order to understand the evolutionary processes governing BeXRBs and find that: (1) BeXRBs require low supernova natal kicks and are thus highly correlated with electron-capture supernovae, (2) the continued evolution of BeXRBs results in the creation of an unstable common envelope phase which leads to mergers for in nearly all cases, (3) the lack of BeXRBs with a black hole accretor can be easily understood if the BeXRB phenomenon is connected to binary interactions. Lastly, we examine what population synthesis models tell us about the BeXRB phenomenon as a function of metallicity, paying specific note to the abnormally large BeXRB population in the SMC.
Biswajit Paul	*Orbital Evolution and Apsidal Motion of HMXBs*
	Orbital period evolution has now been detected in several high mass X-ray binaries. The mechanisms that could be responsible for the observed orbital evolution in these sources will be discussed. We will also discuss the detection of apsidal motion in a Be X-ray binary 4U 0115+63.

6.- The high-energy gamma-ray connection

Josep M. Paredes	*BeXRBs as high-energy gamma-ray sources*
	Gamma-ray emission from five X-ray binaries (XRB) has been detected at very-high energies (VHE) by Cherenkov telescopes and/or at high-energy (HE) by space-borne instruments. In some of them accretion feeds relativistic radio jets and powers the non-thermal emission (i.e., microquasars), whereas in others the power comes from the wind of a young non-accreting pulsar. Significantly, among this small group of stellar gamma-ray sources there are two Be X-ray binary systems. In one of them, PSR B1259-63, the compact object is a pulsar whereas in the other, LSI+61303, the nature of the compact object is unknown. In addition, two new BeXRBs have been proposed to be the counterparts of HE/VHE sources. I will summarise here some of the main observational results on the non-thermal emission from these HE/VHE BeXRBs and of the new potential candidates as well as some of the proposed scenarios to explain the production of HE/VHE gamma-rays

Diego F. Torres — *Be X-ray binaries and their high and very high energy emission*

In this talk i propose to focus on those Be X-ray binaries that have been found at high and very high energy energies, as observed by the Fermi satellite and the Cerenkov telescopes. Depending on the time available, i could either provide a review on the recent observations and theoretical ideas on such sources or focus on some of the recent results of our campaigns (done with Fermi, RXTE, INTEGRAL, Chandra -- as well as the currently solicited observations on XMM and Swift, if approved). In December 2010, PSR B1259-63 will pass again through periastron, and we are working on a MW campaign to cover it. In all cases, the context of these observations with the most recent Fermi data will be provided.

Gustavo E. Romero — *Gamma-ray emission from Be X-ray binaries: theoretical aspects*

I shall discuss different models for the production of gamma-ray emission in Be X-ray binaries. In particular, I shall present models for long period systems with transient accretion, jet models, and colliding wind models. I shall briefly comment on some specific sources and their potential as natural high-energy labs.

Atsuo Okazaki — *Modeling gamma-ray binaries with Be stars*

TeV gamma-ray binaries are a recently established, rare class of gamma-ray sources. Only four binaries show variable TeV emission. Given that all of these systems but one have Be stars, studying the interaction between the Be-star envelope and the compact companion is a key to understanding of physics of high energy emission from these systems. In this paper, we report on the results from 3-D SPH simulations of two TeV binaries with Be stars, PSR B1259-63 and LS I +61 303. For PSR B1259-63, where a relativistic wind from a pulsar interacts with a disk and wind of a Be star, we study the effect of the Be disk density on the interaction structure. We find that, if the Be disk in this system has a typical base density (<= 10^{-10} g/cm^3), the pulsar wind strips off an outer part of the Be disk on the side of the pulsar, truncating the disk at a radius significantly smaller than the pulsar orbit. On the other hand, if the Be disk is denser (~10^{-9} g/cm^3), the outer part of the disk has the large enough inertia not to be quickly blown off, so that a pulsar wind bubble is created when the pulsar passes through/close to the disk. For LS I +61 303, for which the nature of the compact object is not yet known, there are two competing models, the pulsar wind model and the microquasar model. Performing SPH simulations based on these models, we find that two models predict significantly different interaction structure. If the system has an accretor, a transient gas stream from the Be disk towards the compact object appears at each periastron passage and lasts only for about a few days. An accretion disk also forms, which stays persistently, despite the temporary mass transfer from the Be disk. On the other hand, if the system has a pulsar with a relativistic wind, the Be disk is truncated by the pulsar wind, so that neither the gas stream nor the accretion disk is formed. Such a difference should be detected by optical, high-dispersion spectroscopic observations.

Richard Dubois — *LSI +61 303 from the Fermi LAT Perspective*

The Large Area Telescope (LAT) on the Fermi Gamma-ray Space Telescope has been observing the sky in gamma rays since August 2008. It scans the entire sky above 20 MeV every 3 hours with unprecedented sensitivity in the high energy range, making it an ideal monitor for binary systems. Two years of observations at GeV energies bring new insights into LSI +61 303's behavior, notably variability in its base flux levels and orbital modulation. In this talk, we will present LAT results on LSI +61 303 from two years of observation and present a multi wavelength picture of the source, discussing their implications for understanding of the nature of the system.

Robin Corbet — *Hunting for New Gamma-ray Binaries*

Discovery of the New Gamma-ray Binary 1FGL J1018.6-5856 R.H.D. Corbet, on behalf of the LAT collaboration, M.J. Coe, P.G. Edwards, M.D. Filipovic, J.L. Payne, J. Stevens, M.A.P. Torres We present the discovery of a new gamma-ray binary system from the search for periodic modulation in the Fermi LAT light curves of all sources in the first Fermi-LAT catalog. 1FGL J1018.6-5856 was found to have a 16.6 day modulation in its gamma-ray flux that is accompanied by spectral variability. We identify counterparts in the X-ray, radio, and optical wavebands using data from the Swift XRT, ATCA, and telescopes at SAAO and LCO. The X-ray and radio counterparts are highly variable: the X-ray flux appears to be modulated on the orbital period with maximum X-ray flux coinciding with the phase of maximum gamma-ray flux. The optical counterpart has a spectral type of approximately O6V((f)) and shows little variability in a series of Swift UVOT observations. The overall properties of 1FGL J1018.6-5856 indicate that it is a member of the rare gamma-ray binary class of objects, and that it shares several properties with LS 5039. However, there are some differences from LS 5039, including the relative phasing of the gamma-ray flux and spectral modulation and the shape of the X-ray light curve. The similarities and differences will allow us to develop our understanding of the astrophysics involved in these enigmatic objects.

Mark H. Finger — *Fermi/GBM Monitoring of Transient Accreting Pulsars*

Since August 2008 we have been monitoring accreting pulsars using the detectors of the Gamma-ray Burst Monitor (GBM) on Fermi. I review the observations of the detected transient outbursts. These observations allow us to track the pulse profile and frequency during outburst. To date we have detected a total of 67 outbursts from 15 transient sources. These sources are all known or candidate Be/X-ray binaries, except for one which may be a Supergiant Fast X-ray Transient.

Marc Ribo	*The extended and variable radio structure of the gamma-ray binary PSR B1259-63/LS 2883*
	PSR B1259-63 is a 48 ms pulsar in a highly eccentric 3.4-year orbit around the young massive O8.5Ve star LS 2883. During the periastron passage the system displays transient non-thermal unpulsed emission from radio to very high energy gamma rays. It is one of the three galactic binary systems clearly detected at TeV energies, together with LS 5039 and LS I +61 303. I will present the 3-epoch VLBI observations obtained with the Australian Long Baseline Array around the 2007 periastron passage that show, for the first time, extended and variable radio structure, and will discuss their implications. This is the first observational evidence that non-accreting pulsars orbiting massive stars can produce variable extended radio emission at AU scales. I will also present preliminary results of our 5-epoch VLBI observations obtained around the 2010 periastron passage, and will introduce our long-term astrometric project to monitor the orbit of the pulsar, the binary system proper motion and its parallax.

7.- Other Topics

Colleen Wilson-Hodge	*Be/X-ray Binary science for future X-ray timing missions*
	EXO 2030+375, a 42-s accreting pulsar in a 46-day orbit around a Be star, has undergone a detected outburst at nearly every periastron passage since 1991. It has been monitored with BATSE, RXTE, and Fermi/GBM. We will present preliminary results of long-term monitoring, including a long-term frequency history, long-term pulsed flux measurements, and available long-term optical/ir monitoring results.