

**Report on the COSPAR Capacity Building Workshop
"Advanced School on X-ray Astrophysics: data analysis of the XMM-Newton,
Chandra and Suzaku missions"
Ensenada, B.C. Mexico - November 2014**

I - Introduction

The workshop took place in the [Museo Caracol](#), from 17 to 28 November 2014. Primarily organized by COSPAR, it received support from international organizations, like the space agencies ESA, NASA and JAXA, and the International Astronomical Union IAU, as well as from local sponsors, the [Universidad Nacional Autónoma de México \(UNAM\)](#) and the Mexican [Consejo Nacional de Ciencia y Tecnología \(CONACYT\)](#). The workshop was proposed and locally organised by Dr. Teresa García, a participant of a former CB workshop on Infrared Astronomy in Buenos Aires, Argentina.

The main aim of this workshop was to introduce young astrophysicists (PhD students and post-docs) to X-ray astronomy and multi-wavelength opportunities and to train them in the use of data and tools of the X-ray missions XMM-Newton (ESA), Chandra (NASA) and Suzaku (JAXA/NASA). Details about the workshop can be found under the Capacity Building Program pages (<http://cosparhq.cnes.fr/Meetings/Workshops.htm>) and under the local web pages created for the event (www.astrosen.unam.mx/cospar).

II - Participants

A total of 28 applicants were selected out of a total of 29 candidates. The selected students were in the vast majority from 7 Latin American countries (7 from Mexico, 6 from Argentina, 3 from Venezuela, 2 from Brazil, 2 from Chile, and one each from Colombia and Peru), plus one each from India, Germany and South Korea pursuing their studies in Latin America (the first one in Mexico, the next two in Chile). Due to the surprising low registration number obtained this time we have accepted students from outside the region, one each from Russia, Taiwan and the USA. The student from the USA could not come at the end for health reasons, leaving us with 27 selected students. One of the students did not finish the workshop for personal reasons.

The geographical distribution of the students showed at the end a strong regional diversification. Gender showed a 60/40 % female / male students distribution, not atypical taking into account formerly organised workshops in this region. The full list of students including affiliation and nationality is given in Appendix I.

III - Lecturers

The core of the lecturers participating had already experience with previous X-ray COSPAR workshops, two of them (C. Gabriel [ESA, Spain], M. Méndez [KAI, the Netherlands],) have been lecturers in all previous 6 X-ray astronomy workshops, further two lecturers (M. Guainazzi [ESA, Spain], K. Arnaud [NASA, USA]) in 5 of them. Yukikatsu Terada [Saitama University, Japan] participated for the second time, after the last one in Xuyi, China. New in the "team" were: Kim Page [Univ. of Leicester, UK], Diego Altamirano (Univ. of Southampton, UK, a former student of the first CB workshop 2001 in Brazil) and Doug Burke (CfA, USA), and two local lecturers from the UNAM Ensenada: Elena Jiménez-Bailon and Miyaji Takamitsu. The full list is given in Appendix II.

IV - Program

From the program (Fig. 1) it can be read that the school was structured as usual in these workshops with approximately 30% of the time dedicated to science lectures, 10% to lectures on missions' specifics (spacecrafts, instruments and data analysis software) and 60% to the projects the students had to carry on. As in previous occasions, the lecturers have acted also as projects' supervisors.

Fig. 1 - The program

Day / Date												
Sun	16-Nov	Arrival & Registration										
		9:00 - 10:00	10:00 - 11:00		11:15 - 12:15		13:15 - 14:15	14:15 - 15:15		15:30 - 16:30	16:30 - 17:30	17:30 - 18:30
Mon	17-Nov	Opening Ceremony	An Intro to High Energy Astronomy Mariano Méndez	Coffee Break	X-ray detectors Matteo Guainazzi	Lunch Break	The Missions I - XMM S/C & Instruments Carlos Gabriel	The Missions II - Chandra S/C & Instruments Doug Burke	Coffee Break	The Missions III - Suzaku S/C & Instruments Yukikatsu Terada	Data Reduction I - Introduction to SAS Carlos Gabriel	Computer Class Setting up SAS, CIAO and FTOOLS
Tue	18-Nov	Data Reduction II - Introduction to CIAO Doug Burke	Data Reduction III - FTOOLS + Suzaku dedicated S/W Yukikatsu Terada		X-ray Spectrum Analysis I - Low-resolution Spectra Keith Arnaud		X-ray Spectrum Analysis II - High-resolution Spectra Doug Burke	Data Red. IV - A more detailed look at SAS Matteo Guainazzi		Computer Class Project	Computer Class Project	Computer Class Project
Wed	19-Nov	Timing Analysis I Diego Altamirano	Source Searching Methods Carlos Gabriel	X-ray Emission Mechanisms I Elena Jiménez-Ballón	Galaxies, Clusters and Groups I Keith Arnaud	Cataclysmic Variables / Novae / White Dwarfs Kim Page	Astrophysical Plasmas Mariano Méndez	Spectral Timing Studies & adding NuStar to the Missions' Suite Diego Altamirano	Computer Class Project	Computer Class Project	Computer Class Project	
Thu	20-Nov	AGNs I Matteo Guainazzi	Accretion Sources I - Black Holes and Neutron Stars Mariano Méndez	Galaxies, Clusters and Groups II Keith Arnaud					Timing Analysis II Diego Altamirano	ISM & SNR Doug Burke	Computer Class Project	Computer Class Project
Fri	21-Nov	Accretion Sources II - Black Holes and Neutron Stars Diego Altamirano	AGNs II Matteo Guainazzi		Excursion to San Pedro Mártir Observatory							
Sat	22-Nov											
Sun	23-Nov											
Mon	24-Nov	Statistics Mariano Méndez	Future Development of X-ray Astronomy Keith Arnaud	Coffee Break	Computer Class Project	Lunch Break	Computer Class Project	Computer Class Project	Coffee Break	Computer Class Project	Computer Class Project	Computer Class Project
Tue	25-Nov	Extragalactic Surveys Takamitsu Miyaji	Writing Proposals Elena Jiménez-Ballón		Computer Class Project		Computer Class Project	Computer Class Project		Computer Class Project	Computer Class Project	Computer Class Project
Wed	26-Nov	Basics of Scientific Presentation Carlos Gabriel	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	
Thu	27-Nov	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	Computer Class Project	
Fri	28-Nov	Computer Class Project	Project Presentations	Project Presentations	Project Presentations and Closing Meeting							

V - The projects

The students largely defined their projects themselves. A division was made for assigning individual main supervisors according to the subjects chosen, leaving 2 to 3 supervisors per student, with one being the main one. At the end each of the supervisors had on average 3 students under his/her primary responsibility, although due to the characteristics of the different projects, analysis and interpretation stages, etc., de facto each of the supervisors has dealt on average with around 6-9 students. This time, not many of the students have used data from more than one mission. The number of supervisors was felt right this time.

As in all astronomy workshops held in the last 4 years, most students worked on their projects using their own laptops. The exceptions were three students, who used three desktops provided by the local organisers. Working with different operating systems and flavours can be a significant additional burden for a workshop, not only for the installation of the different mission specific tools but also due to eventual problems with specific libraries, etc. We intended to prevent this by asking the students to install and check all the packages needed (SAS, CIAO, FTOOLS, etc) in the weeks before the workshop, offering active support from our side. To a large extent this was done. The problems found during the workshop in this sense have been reduced and could be (almost all) solved. However, the time spent on this by some of the lecturers meant less time for supervision, and some headaches. We intend to formalise this part of the

preparation, including software tests which the students would have to pass, prior to come to the workshop.

The whole of the XMM-Newton archive (raw and processed data) and a good portion of the Chandra archive have been brought in external disks, to avoid the problems arising when 30 students try to download data at the same time. This, a lesson learned from past workshops, proved to be an excellent measure.

VI- Results

At the end of the workshop each student gave a short presentation (7 minutes + 3 minutes discussion time) summarizing the results obtained. It was impressive to see how much practically all students stuck to the seven minutes. For many of the students this was their first time at all giving a presentation in English. A list of the individual projects is given in App. III. The results have been very good, showing that all the participants understand the methodologies of the work in the field and most of them are in principle able to work with data and tools of at least one of the three missions, in some cases with more than one, after returning to their home institutes. Differently to the former X-ray Astronomy workshop in China, in this case most of the students had no previous experience at all in this field.

VII - Venue

The workshop has taken place in Ensenada, Baja California, Mexico, in the conference facilities of a new, not yet inaugurated museum dedicated to natural sciences (Museo Caracol). The place was chosen on the basis of the information we got almost a year before, that the conference facilities would be fully ready at the time of the workshop. This was not the case, and we had to live with multiple problems derived from this fact, especially during the first week, when considerable amounts of installation work was performed very close to the areas dedicated to our workshop (since part of the facilities were needed in the following days for other planned events). Luckily, the museum personnel was very helpful in trying to minimise the inconveniences, and we were able to change rooms, so to reduce the level of noise or heat. Especially in the afternoons the lack of air conditioning was a problem, and we had the choice of opening the windows, with the consequent harsh increase in the noise level coming from outside, or closing them and suffer the heat. External elements contributed negatively to this, directly in front of the lecture rooms a large harbour renovation work was going on.

Another serious problem we had to fight against was the network bandwidth of the location, insufficient for the peak usage when all the participants tried to reach internet. Especially during the first days, when the installation of a necessary extra LAN performed by the LOC conflicted with the museum internet provider, and this was first resolved after several days. Anticipating problems of this kind, we had brought to the workshop the full XMM-Newton archive and part of the Chandra archive in external hard disks. Students and lecturers have also used the nights for downloading other needed data in the hotel.

These problems are surely reflected in the opinion of the students, collected at the end of the workshop as usually.

There were also some positive aspects like spacious rooms both for lecturing and working, and also extra rooms for small groups, which we could get on demand. The technical support for the installation of the three desktops, the establishment of a LAN and the possibility to access all the hard disks containing the data has been efficient and fully professional. Also the coffee services during the breaks (but extending a lot beyond them) were very positive.

VIII - The Hotel

The [Corona Hotel](#) proved to be a very good choice for lodging all non-local students and lecturers. Just in front of the workshop venue and 50 metres from the Riviera Cultural Centre Riviera (where we had breakfast and lunch), it offered us single rooms for the lecturers and double rooms for students. The hotel management behaved forthcoming, and reacted flexibly to our requests.

A restaurant is located within the hotel, where we got supper, almost every evening of the whole stay. It was pre-arranged for a fixed price, and we had every time a choice out of a list of seven different meals. The vegetarian alternative was, however, very poor, despite our requests.

IX - The Riviera Culture Centre

At this nice place we took breakfast and lunch. It was more convenient than at the hotel, and with a large area fully dedicated to us. This place was one of the most prestigious and luxurious hotels in Mexico, when the area developed as a tourist destination mainly due to the alcohol Prohibition in the USA. It was later a casino (Al Capone was several times occupying it fully with his friends), it got finally closed in 1964, and partly rebuilt and reopened in 1978 as a cultural centre.

The service was excellent, and so were also the meals.

X - The excursion

Typically the excursion in these workshops is done on Sunday. This time we have decided to extend it to Saturday and Sunday, due to the special interest in visiting the Mexican national observatory, located at the Sierra de San Pedro Mártir, some 4-5 hours from Ensenada. We left Saturday morning, arriving at the early afternoon, right in time for (an excellent) lunch, visited the large 2m telescope, and then had (an excellent) dinner at the observatory's cafeteria after having a presentation by Dr. Michael Richer, director of the observatory, telling us about the history of astronomy in Mexico and the actual situation and future plans of the place. In the evening we have observed the fantastic sky over this place, considered one of the best in the world for astronomy. For this purpose, a tabletop telescope and binoculars had been brought from Ensenada. We spent several hours observing, and every one of us had enough observation time. We were very thankful to the director and the personnel of the observatory, who did a great job.

XI - General evaluation

Within the different sections we have exposed our judgement about the different aspects of this workshop. While generally satisfied with the final results, we should concentrate on the negative aspects, for taking special care in the future:

- 1) We were surprised by the low number of registrations in the first place. While the number of candidates from South America was perhaps close to acceptable, our expectations for the close region, Mexico and Central America, were not fulfilled by far, despite the two extensions of the due date for registration. For future events we need to clearly establish a network for diffusion and advertisement, to be able to react through it if we see low registration levels. Formalising a list of institutions, including points of contact should be part of the preparation of a workshop.
- 2) The venue was definitely not ready for the workshop, especially in the first week, and we had to deal with noise from outside, and as a consequence of it, with unpleasant heat due to the necessary closed windows. The construction site on the other side of the road was difficult to anticipate, but a larger attention about the level of readiness of the venue itself would have been necessary, at least to better prevent the problems suffered during the first workshop week. In any case, a condition for readiness should be established in the contract, if we deal again with a venue under construction at the time of preparing the event.
- 3) The (not sufficient level of) internet is a problem we have to deal with in most of the workshops. Sometimes it is not only a question of broadband limitations. A lot of places are not prepared for a large number of connections for instance, and the sudden high number, caused by 30-40 laptops, plus a similar number of smartphones put high requirements for places which are not normally hosting events of this type. Again, special care should be always put on this aspect, be this for finding a solution through better connections, or, like we did partially in this case, through making sure that data archives are brought to the workshop.

We have prepared and distributed among the students an evaluation sheet (App. IV), for getting a feedback concerning the different aspects of the workshop, obtaining 14 answered evaluation sheets (over 50%). A first analysis of the results has been performed. The results are similar to the ones obtained in the previous two X-ray workshops, in general terms, while with respect to the local elements (venue, food) the opinions differ partly.

There is a high level of satisfaction with the workshop in general, but especially with the lecturers and supervisors. A large majority of the participants think to be able to use X-ray data in their future research. Unanimously they feel to have benefitted significantly from attending the workshop, we see again a significant difference though between the Asian and Latin American students about the need of help in the future for working with astronomy X-ray data. While the latter considered themselves able to work on these data without much help, the former agreed with this only at the level of 30%. This can have a sociological root (especially given the large level of coincidence in all other aspects), exposing the difficulties when comparing different populations for such evaluations.

The financial support (not covering completely the request for budgetary reasons) is considered sufficient by most students.

The accommodation and venue aspects have been this time also differently ranked than in the two previous X-ray astronomy workshops (San Juan, Argentina and Xuyi, China).

While the accommodation received a high mark the venue has received the worst marks. The food in the hotel was considered good/acceptable, while breakfast and lunch at the Riviera Culture Centre were highly appreciated. The main problem of the venue has been largely discussed above. In any case our special gratitude should go to the local organisers, who tried at all times to minimise the problems caused by the fact that the facilities at the Museo Caracol were not ready at all. Several social events have been organised, a special “gala” dinner, a night visit to the Riviera, the fantastic excursion to the observatory. The level of socialization among the students and the lecturers was again remarkably high, and those events contributed surely significantly.

Again, we would like to thank all the people (especially the local organisation committee and the lecturers) and the institutions that have substantially contributed to making possible this event: UNAM, CONACYT, IAU, COSPAR, ESA, NASA, JAXA and the three missions Chandra, XMM-Newton and Suzaku.

Carlos Gabriel - Mariano Méndez

Appendix I - List of participants

Surname	Given Name	Country	Organization	Nationality
Cúneo	Virginia Anahí	Argentina	Obs. Ast. De Córdoba	Argentina
Oio	Gabriel Andres	Argentina	IATE-CONICET	Argentina
Schmidt	Eduardo	Argentina	Inst.Astro.Teórica y Exp	Argentina
Sosa	Marina	Argentina	IALP	Argentina
Supan	Leonardo	Argentina	IAFE,CONICET,UBA	Argentina
Zibecchi	Lorena Cecilia	Argentina	CONICET	Argentina
Santiago	Raquel	Brazil	obs. Do ValongoC	Brazil
Ribeiro	Evandro	Brazil	Observatorio Nacional	Brazil
Díaz Tello	Jorge	Mexico	UNAM-Ensenada	Chile
Laporte	Nicolas	Chile	PUC	Chile
Torres Zafra	Juanita	Argentina	IALP	Colombia
Schulze	Steve	Chile	Pontificia Uni.Cat.Chile	Germany
Venkatapathy	Yoganasimhan	Mexico	University Guanajuato	India
Altamirano	Liliana	Mexico	IA-UNAM Ensenada	Mexico
Hernandez	Stephania	Mexico	IA-UNAM Ensenada	Mexico
Pereyra T	Emma	Mexico	IA-UNAM Ensenada	Mexico
Román-Zúñiga	Carlos	Mexico	IA-UNAM-Ensenada	Mexico
Romero-Cañizales	Cristina	Chile	Pontificia Uni.Cat.Chile	Mexico
Trejo	Oriana	Mexico	IA-UNAM	Mexico
Vazquez	Veronica	Mexico	IA-UNAM	Mexico
Flores	Miriam	Chile	PUC	Peru
Kirichenko	Aida	Russian	Loffe Institute	Russia
Kim	Sam	Chile	Pontificia Uni.Cat.Chile	South-Korea
Jin	Ruolan	Taiwan	IA National Tsing Hua Unive	Taiwan
Calderón	Paúl Adrián	Venezuela	IVIC	Venezuela
Ocando Arrieta	Maria	Venezuela	CIDA	Venezuela
Perez Blanco	Alice	Venezuela	CIDA	Venezuela

Appendix II - Lecturers / Supervisors

LECTURERS

Carlos Gabriel	ESA, Spain – XMM-Newton
Diego Altamirano	Univ. of Southampton, UK
Elena Jiménez-Bailón	IA-UNAM Ensenada
Keith Arnaud	GSFC, USA
Kim Page	Univ. of Leicester, UK
Mariano Méndez	KAI, The Netherlands
Matteo Guainazzi	ESA, Spain
Doug Burke	SAO/CfA, Chandra, USA
Takamitsu, Miyaji	IA-UNAM Ensenada
Yukikatsu Terada	Saitama Univ. Japan - Suzaku

App. III - Projects

X-ray emission of magnetic stars

Environmental effects in galaxy evolution: gravitational effects and the role of the intracluster medium seen in X-ray.

IGR J17091-3624 A candidate black hole in its quiescent state

Diffuse X-ray emission in Pne

Potential changes in the AGN structure of sources with low redshift

Analysis of GRB061121 using XMM-Newton

X-ray imaging spectroscopy of young stellar sources at 2 kpc

AGN in galaxy groups

An X-ray view of the cluster Gamma Velorum

X-ray sources in the Sigma Orionis Cluster

An X-ray view of the merging system Arp299

X-ray study of the γ -ray pulsar J1932+1916 based on Suzaku observations

A study of the PKS 1814-63 blazar with Chandra

The life and death of massive stars

The enigmatic black hole candidate and transient IGR J17091-3624 in its quiescent state as seen with XMM-Newton

AGN embedded Dusty Star-bursting Galaxy

Spectral Index on NLS1 type galaxies

V4641 Sgr (XTE J1819-254)

The redshift blazars

Variability and spectral analysis of PKS 2201+044 and 3C 279

The X-ray evolution of supernova 2004am

An X-ray study of the supernova remnant G353.6-0.7

Black hole mass in a narrow line Seyfert-1 galaxy

A small study of the interstellar medium in Cygnus X-2, using RGS of XMM-Newton

Can X-rays help to identify the first galaxies?

Exploring Hot Gas in Galaxy Groups and Clusters with Chandra

Appendix IV - Results from the evaluation form

22nd COSPAR Capacity-building workshop, Ensenada, BC, Mexico (2014)

Workshop Evaluation Form

General

	5	4	3	2	1	
The website told me all I needed to know about the workshop	3	7	3	0	1	5=strongly agree
The application form was easy to fill in	13	1	0	0	0	4=agree
Applications were efficiently handled	10	4	0	0	0	3=no strong feeling
I had time enough to make my travel arrangements	11	3	0	0	0	2=disagree
The financial support I got was sufficient	6	4	4	0	0	1=strongly disagree

Comments

was difficult to find the schedule in the web page.
 The financial support was essential to me. Otherwise, I wouldn't be able to attend to the workshop.
 Registration for the workshop and the help of the organizers was appropriate for these events.

	5	4	3	2	1	
Science Lectures						5=strongly agree
These lectures were for me personally the most useful part of the workshop	6	6	2	0	0	4=agree
<i>Answer only one of these</i>						3=no strong feeling
The time spent on the lectures was too long	1	0	0	0	0	2=disagree
Or the time spent on the lectures was too short	1	0	0	0	0	1=strongly disagree
Or the time spent on the lectures was just right	7	5	0	0	0	
<i>Answer only one of these</i>						
The lectures were at too high a level	0	0	1	0	0	
Or the lectures were at too low a level	0	0	0	0	0	
Or the lectures were just right	7	5	0	0	0	
The lectures were well presented	10	4	0	0	0	

The lectures were stimulating	11	1	2	0	0
The lecturers responded well to questions	12	1	1	0	0
I found it easy to get on with the lecturers	10	3	1	0	0
The lecture room was comfortable	1	2	5	5	1

Comments

Were there any other topics you would have found especially useful?

some lectures made me feel confused and I thought that was not for me, but then when we work on the project, some of the fears and disappointing feelings disappeared.

Also the computer class were useful part of the workshop. The lecture room was not comfortable because it was very hot and the chairs were not comfortable.

X-rays from stars ("normal" stars, wolf-rayets, T-Tauri, etc)

I enjoyed a lot, I learned so many things. The chairs were really uncomfortable but I like the lectures and love my project. Thanks to all of you for teaching and for having patience with us.

The workshop was a great help to learn how to reduce and analyze data from XMM and Chandra, however for the next workshops are recommended to plan better workplace for students. Including internet service.

Other comments?

Some lectures were at too high-level for someone who few knowledge on X-Ray astronomy. Lectures on Instruments and basic concepts were absolutely needed. The lectures on the future on X-Ray astronomy have been also very usefull, but it would be nice to have more details discussion on future telescopes (but I know that the time is missing over the week and that we have to cover a lot of topics). It would be good if we can have a printed version of the lectures or at least the plots to take notes more easily. Tables would be appreciated to take note, but I agree that the place was not fully designed to this kind of workshop.

	5	4	3	2	1	
Software Lectures						5=strongly agree
These lectures were for me personally the most useful part of the workshop	2	5	3	2	0	4=agree
<i>Answer only one of these</i>						3=no strong feeling
The time spent on the lectures was too long	0	2	1	0	0	2=disagree
Or the time spent on the lectures was too short	0	1	0	0	0	1=strongly disagree
Or the time spent on the lectures was just right	6	2	2	0	0	

Answer only one of these

The lectures were at too high a level	0	2	1	0	0
Or the lectures were at too low a level	0	0	0	0	0
Or the lectures were just right	5	3	2	0	0
The lectures were intelligible	5	4	2	1	0
The lectures were well presented	7	3	2	0	0
The lectures were stimulating	7	3	2	1	0
The lecturers responded well to questions	6	5	1	0	0
I found it easy to get on with the lecturers	5	3	2	1	0

Comments

I think that some lectures like those that explain the physical process that produce x-ray emissions must be presented before the lectures that describe the reduction process. That will help us to be clear what we expect to obtain and explain why are we doing what we do. The explanation about how to use the software have to be more extensive o dinamica for pin up the knowledge

	5	4	3	2	1	
Projects						5=strongly agree 4=agree 3=no strong feeling 2=disagree 1=strongly disagree
The project was for me personally the most useful part of the workshop	5	7	1	0	0	
<i>Answer only one of these</i>						
The time spent on the projects was too long	0	0	0	0	0	
Or the time spent on the projects was too short	1	1	2	0	0	
Or the time spent on the projects was just right	4	5	0	0	0	
The instruction I received to install software before the workshop were ap	5	4	2	1	0	
The lectures did not prepare me adequately for the projects	0	1	2	7	3	
I would have preferred to have a PC provided than using my laptop	0	0	1	4	6	
I would have preferred to have an own laptop instead of using the provide	4	4	2	0	1	
I had difficulty using Linux	0	1	1	4	7	
The help I got with my project was adequate	9	4	0	0	0	

I found the supervisors helpful and easy to get on with	10	3	0	0	0
I realized too late which the ultimate scope of the project is	1	0	5	4	2

Comments

I am totally satisfied with the help provided during the project time, I feel that I have learned a lot from that time. the professors that helped me, also encouraged me to do different experiments with my data and find by my self the best model, the proves that I can use to explain my decisions in all moment, they made me feel comfortable with my ideas and at last but not least important with my English skills

The projects is an important part of the workshop allowing us to work in our own topic and the presentation at the end of the workshop it is a good way to know exactly which topic each student is working on (and a good exercise for young student). But, in my opinion, lecturers put too much pressure on the last day talk, making some students completely terrified on Thursday evening, because it was their first scientific talk. The proposed goal in my project was very difficult to obtain. This caused me many obstacles and much investment of time in search of the solution.

	5	4	3	2	1	
Accommodation and Venue						5=strongly agree 4=agree 3=no strong feeling 2=disagree 1=strongly disagree
The airport transport was efficiently done	4	7	0	1	0	
The transport to Ensenada was efficiently done	4	7	0	1	0	
The rooms at the Corona Hotel were good	9	3	0	0	0	
The food at the Corona Hotel was good	2	5	4	1	0	
The breakfast at the Riviera was good	6	4	1	0	0	
The lunch food at the Riviera was good	8	5	0	0	0	
Generally, the accomodation environment was good	7	5	0	0	0	
The Museo Caracol was a good place to hold this workshop	2	1	4	3	3	
The internet connection was acceptable	0	1	5	4	3	
The excursion to the Observatorio San Pedro Martir was good	10	3	0	0	0	

Comments

some of the questions do not apply for my, because I am local.

	5	4	3	2	1	
The Future						5=strongly agree
						4=agree
						3=no strong feeling
						2=disagree
						1=strongly disagree
I will be able to use X-ray data in my future research	10	3	0	0	0	
I have learned enough to do this without much extra help	2	6	5	0	0	
If I have problems, I know where to go for help	11	3	0	0	0	
I have benefitted significantly from attending the workshop	11	1	0	0	0	

General Comments (on anything whatever to do with the workshop)

I want to thank all of the professors for your time and patience to us, for give me the opportunity to be one of the selected students to participate on the workshop.

Great workshop. I've learned many thing that i can use in the future for expanse my field of work. Excellent teacher, very nice people that enjoy this work and share this knowledge

I arrived at this workshop with few knowledges on the X-Ray astronomy (only the basics I get at the University during my Master thesis) and I learned a lot of things these days on X-Ray astronomy, that will be for sure usefull for my future.

THANK YOU FOR THE GREAT SCHOOL!

Thank you very much for the opportunity!! I've learned a lot and I had the chance to meet people from around the world, both students and teachers. And the best part was the willingness of lectures to help me and explain a lot.

All the lectures are so enthusiastic in many ways. The location of the lecture room "will" be great after all the constrution works finish. I love the location of the dining place. I know it is not easy to introduce all the related topics in two weeks but this workshop demonstrates the best design that I've ever met in other places. I am so honored that I have this opportunity to participate in this workshop. I'll defintely encourage the other students and young astronomers to apply for COSPAR workshops in the following years.

Appendix V – Group photos



Group photo I – Happy last morning... on the terrace of the Caracol Museum



Group photo II – the other perspective of the terrace



Group photo III: at the Observatory – Sierra de San Pedro Mártir