NEWSLETTER

03/2017 Nº 5

EDITORIAL

After last year's experience NASE has granted again the award to the best course of 2016. It's a way of recognizing the work well done of the local groups. In 2016 this award has been granted ex-aequo to:

The local group of Paraguay-Asunción, for the course organized in Villarrica from 13 to 27 of August, in collaboration with the Faculty of Exact and Natural Sciences (FACEM-UNA) of the National University of Asunción. The local group had creative and willful performances that allowed to carry the course out with big success.

The Local Group of Argentina-Entre Rios, for the course that took place in the City of Concordia from 12 to 14 September, in collaboration with CONICET and the Department of Schools of Concord, where it was necessary to solve many problems in a rapid and effective way. They complied with quality requisites although the teachers were not of the area of sciences but of geography and history.

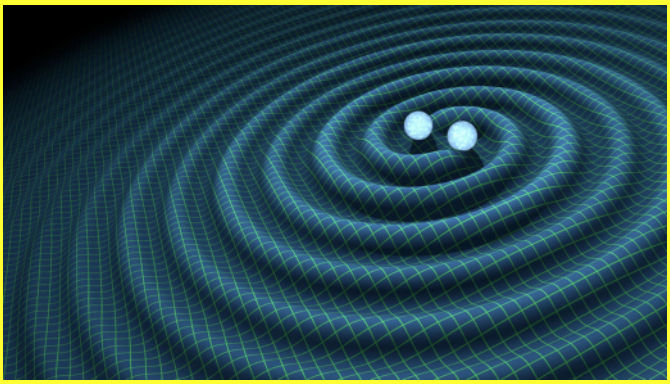
The Jury of NASE wants to emphasize that in both cases the courses were organized by supreme efficiency and big enthusiasm, and that they carried out all the conferences, workshops, remarks and visits. The surveys of the assistants of Paraguay valuated the course of excellent form as you can see on the web page. During Concord, the a comparison of the knowledge before and after the course gave very positive results.

NEWS

GRAVITATIONAL WAVES

On February 11, 2016, the director of LIGO (Laser Interferometer Gravitational-Wave Observatory), a laboratory of the US-American universities MIT and Caltech, announced that they had found for the first time gravitational waves, proceeding from the merger of two black holes. A few months later they did it again with another couple of black holes.

The gravitational waves are a few small perturbations in the space - time structure of the Universe, which travel at the speed of the light. Einstein predicted them theoretically, but it has been now, more than one century after the Theory of the Relativity, when they have been detected.



The prestigious magazine «Science« has declared this discovery as the most excellent of the year 2016. The motives are different: in addition to confirming one more prediction of the Theory of the General Relativity, and of finishing an experimental search that has lasted forty years, it opens a new age in the astronomy, in which the scientists have a completely different way of observing the Cosmos.

The direct detection of the waves happened in September, 2015, and it was coming from a point placed very far of the Earth, to 1.300 million light years, where two black holes, each one with 30 times the Solar mass, were fusing. A few months later reached us a second signal, proceeding from another couple of black holes.

Till now, almost everything that was known about the Cosmos had managed with electromagnetic radiation (visible light, beams gamma or ultraviolet). But these waves are something different, and they promise to throw light even on the dark energy or what happened after Big Bang. The scientists are trying to detect more gravitational waves and to improve their instruments on the Earth. Also, the (ESA) European Spatial Agency and the NASA are developing the SMOOTH mission, with which they will have a detector of gravitational waves in the space, far from the terrestrial interferences.

HYPATIA

Hypatia was a philosopher and mathematics of the fifth century, about which very little is known. He was murdered by a band of exalted. Ari Belenkiy has suggested recently the hypothesis of which he dedicated its last days to find the exact time of the spring equinox, and proposes the UNESCO to remember Hypatia annually on this day. You can see and support this request in Internet.

Ricardo Moreno

COURSES

COURSE NASE in Tegucigalpa (Honduras) 22-25 August, 2016

In cooperation with the faculty of Spatial Sciences, of the Autonomous National University and the State Department of Honduras.

The 51 participants were teachers of subjects of sciences, whose students were older than 18 years. In general they had already had some contact with Astronomy. In the final survey they proved to be very satisfied by the content of the course. They suggested to make two levels, as well as to dedicate divergent times of the workshops to be able to make all the Activities come true.

Course NASE in Cluj (Romania) 5-8 September, 2016

In cooperation with "Babeş -Bolyai" University and Astronomical Institute of the Romanian Academy.

They were teaching especially Physics, of secondary school. There was one who was working with blind students, and who extracted many ideas to realize them of tactile form.

For the final survey they valued especially well the Workshops, and the practical activities that used cheap materials.

Course NASE in Jujuy (Argentina) 5-7 September, 2016

It was realized in the Technical School Provincial "General Aristóbulo Vargas Belmonte", organized by the CONICET (National Council of Scientific and Technical Investigations) of Argentina. More than 50 teachers took part, of Elementary and Secondary Education.

Almost no participant had had astronomical formation, and they all went away with desire of prolonging the Course.

Course NASE in Concord (Argentina), 12-14 September, 2016

In cooperation with the Interactive Museum of Sciences (MIC) of the Top Institute of Industrial Disciplines and Agricultural Sciences and the Departmental Direction of Schools of Concord.

They were 25 teachers of 12- to 18-year-old students. They showed their gratitude for the abundant content of the course, which will serve them for their classes. Several mentioned that it was the first course that they were doing that teaches them how to teach a topic.

Course NASE in Havana (Cuba), 27-30 September, 2016

This course was done in cooperation with the Planetarium of Havana and the Office of the Historian. The second course that realizes the group NASE of Cuba.

There took part 27 teachers of high and university school, and also some students of the School of Professorship.

Also participated several persons responsible for the development of the curricular of the country, with educational training in Physics, which wanted to qualify in new didactic methodologies, and which had heard of the course of participants of the previous course.

Course NASE in Bogota (Colombia), 12-15 October, 2016

The Course was done in cooperation with the Planetarium of Bogota, and in the cartel announcer was written: "we do of the classes lounge an astronomy laboratory...".

It was not the first course NASE in Bogota, nor it will be the last one. It is a very active and consolidated national group. There took part 35 teachers of subjects of sciences, most of which had a very basic astronomy formation.

Course NASE in Medellin (Colombia), 13-14 October, 2016

Coinciding with the previous one, this course came true in another Colombian city, Medellin.

In this case it was in cooperation with the Planetarium of Medellin and with the Metropolitan Technological institute. A total of 30 participants, teachers of primary and secondary school of sciences subjects.

A participant went out with the idea of sharing what he has learned with other teachers of very remote places, and to meet every Saturday.

Course NASE in San Luis Potosí (Mexico) 28-30 October, 2016

This is the Fourth course Nase that is celebrated in Potosí, with the cooperation of the Autonomous University of San Luis Potosí.

There participated 36 persons, who in general had some previous formation in the matter. There were teachers of primary, of secondary school and also there was a good group dedicated to the astronomical publication, proceeding even from several nearby States.

Resulted in being there a very active participation and a productive exchange of experiences.

MATERIAL

Fig. 1 Measuring the area of the lantern

In the book of the Course NASE there is an activity in the Workshop of the Solar Bogey, in which, with a sheet of role and a spot of oil, the potency of the Sun is compared with that of a bulb, and by this way the Luminosity of the Sun is estimated. There is used the Law of the inverse one of squares $P_1/d_1^2=P_2/d_2^2$.

With a similar reasoning, we also can calculate the distance to the stars, supposing that they are similar to the Sun, but more distant. We will need to make a small artificial star. For this we can use a piece of optical fibre (used for the digital connection of the audio of a TV), a piece of aluminium foil and a lantern with a bulb of well-known potency.

If we do not have the optical fibre, we can replace it with a small hole in the aluminium foil done with a needle of sewing. To know the size of the hole, we can put several needles one next to other one up to completing the 1 cm breadth. The diameter of one of them (and therefore of the hole in the aluminium foil) will be 1cm divided between the number of needles.

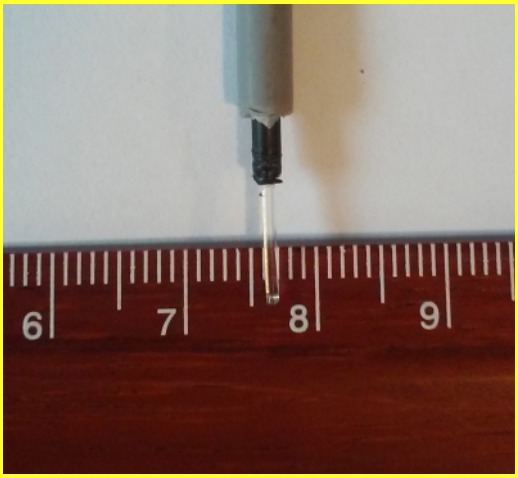


Fig 2 Measuring the optical fibre

To know the potency of the lantern, we will have to measure with a multimeter the resistance of the bulb R, take the voltage of the batteries V and calculate the potency with the formula $P=V^2/R$.

We measure the area of the zone of the lantern where goes out the light (Fig 1), and also the area of the section of the optical fibre (Fig 2), or of the hole done with the needle in the aluminium foil. All of them are circular areas = πr^2. We cover the lantern with aluminium foil, with the inserted optical fibre. The potency P_1 that goes out for the optical fibre will be a fraction of the potency of the bulb of the lantern. This fraction is the quotient between the area of the optical fibre and the area of the lantern where the light goes out.


Fig. 3 The artificial star

With the help of another person, we remove the artificial star of potency P_1 at a distance d_1 in the one that we see with the same glow as a real star in the firmament. Doing the assumption that the real star has the potency our Sun (P_2) that it is located at a distance d_2, it is possible to apply the already said formula $P_1/d_1^2=P_2/d_2^2$ and to get an estimation of the distance d_2 of the star. The result is a few light years, minor that the real one. The reason is that most of the stars that we see in the firmament are really of major potency than the Sun. But the result of "several light years" gives us an idea of its real distance. You can find many practical materials on the web page of **NASE** (in Spanish and in English):

http://sac.csic.es/astrosecundaria/es/material_complementario/MaterialComplementario.php