



NEWSLETTER

11/2019

Nº 9

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EDITORIAL

We have reached the 145th NASE course, and the year is not yet over. We've come to many more places. In addition to the traditional groups, courses have been given in Moscow, Mongolia, Iran, Senegal, Armenia, Uganda, Indonesia and Thailand. And everywhere the material and content are very well received. You can see in this Newsletter photos and impressions of the last courses.

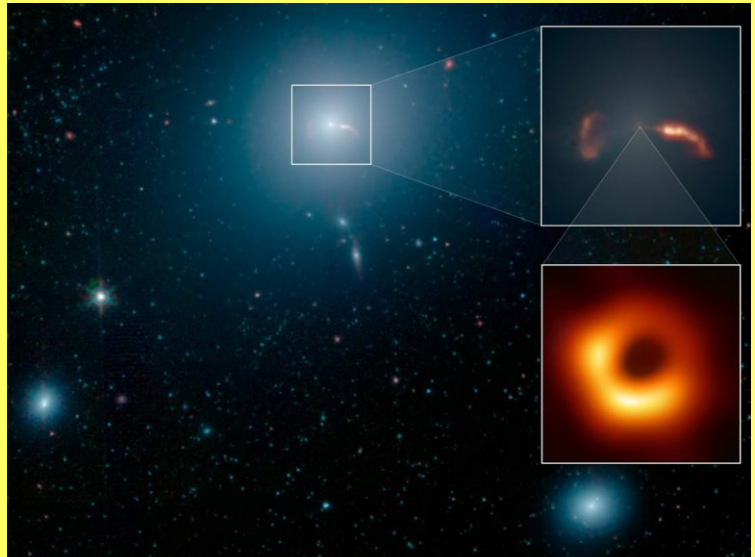
On the other hand, in April 2019 the first image of the environment of a black hole was made public, and more are announced. We couldn't help but include the news in this year when the IAU is 100 years old and there are so many activities around the world celebrating the anniversary. A proposal by NASE on the calculation of the Power of the Sun has been very successful. In the Materials section you can see the proposal, and on the NASE website you can see the results they have sent from all over the world.



NEWS

FIRST IMAGE OF A BLACK HOLE

The Event Horizons Telescope (EHT) is an array of antennas spread throughout the Earth operating at millimeter wavelengths. It is so complex that it only makes observations ten or twelve days a year. In the 2017 observation campaign its two main objectives were M87 and SgrA*. The results of M87 were released two years later, on April 10, 2019. The results of SgrA*, at the centre of our galaxy, are yet to be published.



What you see in the image is the so-called ring of increased light from an accretion disk around the event horizon. The dark zone is the shadow of the black hole itself that would be in the center and that cannot be seen.

In the image above you can see the galaxy M87, where inside is the black hole now photographed.

In the image below, you can see a simulation made by NASA of what would be a black hole with an accretion disk, and the ring of light increased.



SOLAR ECLIPSE PHOTOGRAPHED FROM THE MOON

On July 2, 2019 there was a solar eclipse that from Chile, Argentina and the Pacific was seen as a total eclipse. But it was also observed from the Moon, as shown in these two photographs that were taken by the Chinese microsatellite Longjiang-2. The circular dark spot on the Earth is the shadow of the Moon itself on the surface of the Earth. The lunar surface is seen in the foreground, something not photographed so far.



The Astronomy Day in Schools

The Astronomy Day in Schools global initiative has approximately 100 registered participants in 40 countries globally. You can visit:

www.iau-100.org/astro-day-schools



COURSES



125 NASE Course in Managua (Nicaragua), 11-13 Dec. 2018

In cooperation with the Ministry of Education of Nicaragua and the Astronomical Observatory of the National Autonomous University of Nicaragua.

It was attended by 43 teachers, teachers from the Ministry of Education (MINED) from six municipalities in the Department of Boaco, physics students from the Faculties of Education and Languages and two teachers from the Economic Sciences corresponding to UNAN-Managua.



126 NASE Course in Loulé (Portugal) - 18-22 Dec. 2018

This course was done in cooperation with Centro de Formação Do Litoral à Serra.

For the most part, participants felt that the course had excellent quality, although some participants felt that the scientific level of some workshops was too high.

Most of the trainees highlighted the quality of the trainers and of the materials supplied, and were unanimous in declaring the usefulness of the materials produced in the workshops for their classrooms.



127 NASE Course in Medellín (Colombia) - January 25-26, 2019

In cooperation with Planetario de Medellín and Instituto Tecnológico Metropolitano.

In general, they valued very much the reception of so many didactic strategies for teaching astronomy in the classroom, and the enormous potential that these activities have to introduce and motivate young people towards the study of the universe.

They consider it very good that the teachers have this possibility of repeating these activities in the classroom.



128 NASE Course in Barcelona (Spain), from 30 January to 5 June 2019

In cooperation with CEFIRE, Departament de Ensenyament, Generalitat de Catalunya

Some opinions: "It is perfect for Natural Sciences of 12 & 13 years or in mathematics to give examples of application related to astronomy (which they always like) and you can take other examples". "It has given me ideas of experiments very well completed with theory very well presented and which can also be exposed to students".



129 NASE Course in Panama City, 4-8 February 2019

In cooperation with Astronova, the University of Panama, Department of Physics and the International Maritime University.

To implement astronomy in education, they suggest making methodological guides for the workshops so that teachers can easily implement them.

They also suggest that if schools have a telescope, install it at the entrance, as some students arrive at schools before dawn.



130 NASE Course in San Juan (Puerto Rico), 15-18 Feb. 2019

In cooperation with Universidad Ana G. Méndez and Ciencia Puerto Rico.

They commented that teachers can integrate topics such as gravity, waves from physics, and there is a need for preparation in astronomy. And the students are eager, hungry for astronomy.



131 NASE Course in San Salvador (El Salvador), 20-22 Feb, 2019

This course was done in cooperation with the University of El Salvador and the Faculty of Natural Sciences and Mathematics.

A teacher of 12-18 commented that in the country they usually give astronomy courses, but in general they don't go beyond theory and some observation, but they have never shown the subjects in a didactic way, as in the case of NASE. It is one thing to have the knowledge and another to have the resources to visualize them, so that they do not remain only in the field of abstraction. And NASE creates a very motivating space.



132 NASE Course in Bushehr (Iran) - 9-12 March 2019

It was carried out in cooperation with ITAU, International Teachers Astronomical Union.

There were 52 participants. Some opinions: "I am a teacher (physics teacher) and I was looking for a formula. This program changed my vision, but now Not only did I understand the concepts very well, also learned how to train". "People are different in learning, someone by seeing and some by hearing. But the simple way of your teaching, helped me a lot and was great for all people with any different method of learning".



133 Course in Quetzaltenango (Guatemala), 14-16 March, 2019

This course was in cooperation with Asociación Quetzalteca de Aficionados a la Astronomía and the Escuela de Ciencias Físicas y Matemáticas.

The call gave preference to acting teachers, especially if they included astronomy topics in their courses. Fifteen professors were selected and at the end a university professor was added.

The development of the workshops was very good and this was reflected in the most positive opinions of the participants.



134 NASE Course in Guadalajara (Mexico) - 2-5 April, 2019

This course was in cooperation with the University of Guadalajara and CUCEI.

One of the trainers commented that he felt very good dictating the workshops and what he appreciated most was that NASE proposes very easy activities that give impressive results, such as the case of the oil stain photometer, simple experiences that give very important data that allow you to derive other topics almost immediately. In short, the course is very attractive for teachers.



135 NASE Course Mbarara (Uganda), 5-10 April 2019

This course was done in cooperation with Mbarara University of Science and Technology.

There were 36 participants and 6 instructors. The photo shows how much fun they had and how much they learned.



136 NASE Course in Dakar (Senegal) - 22-25 April 2019

In cooperation with L'Association Senegalaise pour la Promotion de l'Astronomie (ASPA) and Laboratoire de Teledetection Appliquee (LTA)

Thirty-seven teachers participated, including the head of astronomy in Senegal, who said: Le cours a été un grand plaisir. Je remercie aux visiteurs de NASE pour votre travail. We want to put in place a solid team NASE au Sénégal with ASPA - Astronomie Sénégal. Salma a eu le courage d'organiser ce cours et cela c'est très important. Le cours est un début qui doit être poursuivi.

Another participant said: "the formateurs utilisaient des dispositifs très simples qui nous permettaient de comprendre l'astronomie beaucoup plus facilement. J'ai vraiment apprécié les méthodes pédagogiques et le fait qu'il y avait beaucoup d'activités pratiques".



137 NASE Yerevan Course (Armenia) - 6-8 May, 2019

In cooperation with Byurakan Astrophysical Observatory (BAO).

The participants were very grateful for the course. They said : I like it. In particular, observation that was one of my dreams. Thank you. I believe that the time was very short. I would like to enjoy the course more days and it should be organized periodically and include more practical activities.



138 NASE Course in Mbarara (Uganda) - 13-14 May, 2019

In cooperation with Mbarara University of Science and Technology.

Twenty-six teachers participated, most of them in Physics and with students over 18 years of age. The survey showed a high degree of satisfaction, and they proposed that the course be longer.

In the infrared detection activity, they placed the prism in a novel, effective and very easy way, as seen in the photo.



139 NASE Course in Chiang Mai (Thailand) - 21-24 May, 2019

In cooperation with National Astronomical Research Institute of Thailand NARIT.

Thirty-six teachers participated. Some opinions: I was reluctant to attend as I thought the course would be difficult but when I got here I liked the activities and gained confidence. A friendly atmosphere was created by the instructors.

Travelling a long way was difficult but we made friends with similar teachers and gained confidence in speaking English.



140 NASE Course in Tsetserleg (Mongolia) - 19-21 June, 2019

In cooperation with Space Science and Remote Sensing Laboratory, National University of Mongolia and Science and Technology Erdem School. .

There were a group of 13 science teachers in active and a set of students of the last academic course in their degree. These students will begin to work as new teacher next course, that is to say in three months. This was a very special situation that was very interesting for all of us.



141 NASE Course in Guatemala (Guatemala) - 19-21 June, 2019

In cooperation with the University of San Carlos de Guatemala and the School of Physical Sciences and Mathematics.

It is worth mentioning that the monitors who gave most of the workshops received positive comments, congratulating them for the passion they transmitted, the knowledge they manage and the ability to make the content accessible.

The activities within the program were carried out with enthusiasm and success of the participants and within the established schedule. About 40 people participated.



142 NASE Course in Mendoza (Argentina) 16-22 August, 2019

The Course was developed under the auspices of CONICET within the framework of the Career of the Professorship in Mathematics, Physics and Biology of the Faculty of Exact and Natural Sciences of the National University of Cuyo.

It forms part of the University's teacher training programme, but is open to active teachers. On this occasion the only students attending the course were students of the Faculty. Several attendees stressed the need to give more publicity to the course, including in the field of Teachers.



143 NASE Course in Lampung, Indonesia - 19-22 August, 2019

In cooperation with Institut Teknologi Sumatera.

There were several professors at the University (65% of participants). Some of them mentioned that the level of the course was low for them, but all of them mentioned that the course had been useful or very useful for them. Really, they participated in the course for personal reason more than for professional reason.



144 NASE Course in Moscow (Russia) - 26-29 August, 2019

In cooperation with Moscow Pedagogical State University.

Twenty-four teachers participated. The Russian school curriculum has been modified this year, and topics of astronomy and astrophysics have been included in the last year, so this course was very much appreciated by Russian teachers.

Some impressions: "The course is very useful for us and the children. The experiments can be made very easy. I enjoyed very much the workshops". "Thank you very much for this course. I liked very much the experiments and that they are not expensive and useful for the classes in school".



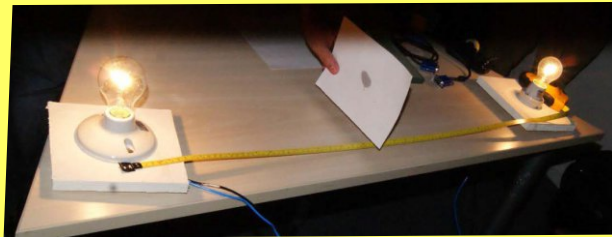
MATERIAL

HOW TO MEASURE THE POWER OF THE SUN

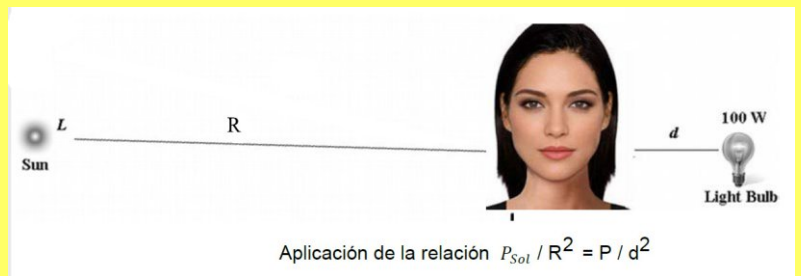
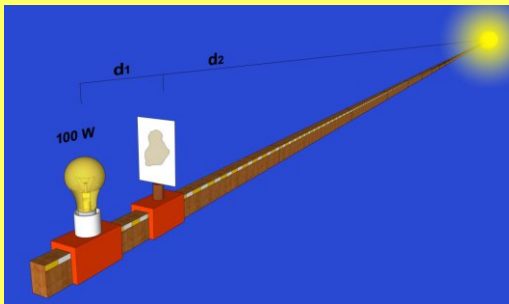
To commemorate the 100 years of the International Astronomical Union, NASE proposes to all its participants and instructors to carry out this experience. Project launch: March 21, 2019 (equinox). The activity will be open until: June 21, 2019 (solstice).

Using the oil spot photometer, we will calculate the power of the Sun comparing it with, for example, a 100 W bulb:

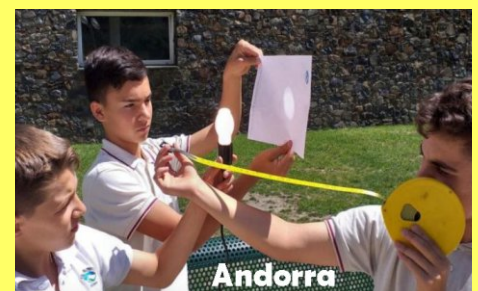
$$\frac{P_1}{d_1^2} = \frac{P_2}{d_2^2}$$



We can perform another experiment to estimate the solar luminosity, replacing the paper with our face.



We show some activities carried out by students and teachers from all over the world. You can see their scientific reports in this link.



You can visit the website of **NASE**.