I Workshop on Science and Astronomy at the DAM of the UB

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Abstract The Department of Astronomy and Meteorology of the University of Barcelona organized the *I Workshop on Science and Astronomy for Youth* in November 2007, with the title *The Sun: radiation and gravitation*, as one of its outreach activities for high school students. About 350 participants took part in 4 different activities during the Workshop. On one hand, some days before of the beginning of the activities, some DAM members went to the different high schools to present the sessions and introduce some key concepts to follow them. On the other hand, during their visit to the facilities of the Physics Faculty and the Astronomy Department of the University of Barcelona, they took part in: an observation of the Sun looking at sunspots, and a short lecture on safety rules on Sun's observations and on the Sun's structure and activity; a lecture with the title *Why do stars shine?*; and a computer experience named *Gravitation: Kepler's 3rd Law*.

1 Introduction

The Department of Astronomy and Meteorology (DAM) of the University of Barcelona has a large experience carrying out activities on popularization of science and astronomy, both for general public and for students at primary and secondary level. Besides keeping on giving lectures at different places, during these last years we have added the new technologies to our work. An example is our live webcasts of transits and eclipses. We also have endeavoured more ambitious activities, such as this *I Workshop on Science and Astronomy for Youth*.

The workshop consisted in three activities performed in the DAM during a morning. The activities were advertised at the end of June 2007 through booklets sent by ordinary mail to the departments of science of the secondary schools, mainly in

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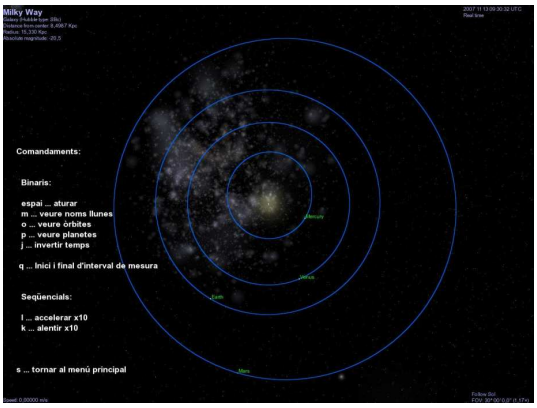

Fig. 1 Screenshot of Celestia running the script used in the computer experience *Gravitation: Kepler's 3rd Law*

Barcelona's area. The received about 700 applications and the foreseen 3 days workshop was extended to 4 days. The workshop was structured in a preparatory session in the schools, the development of the activities in DAM and additional material to work out at their schools after the visit to DAM.

2 Previous Activities

Trying to prepare the students to attend the activities at the Physics Faculty with the required concepts clearly understood, some DAM members went to their high schools a few days before the Workshop. There, by a short and informal lecture, the key ideas required to take a profit from the main activities of the Workshop were introduced and the way their visit should work was explained in order to avoid difficulties at the Physics Faculty facilities.

3 Activities at the Physics Faculty

Every morning, from the 13th to the 16th November 2007, we received an average of almost 90 students per day, divided in three groups. Every group carried out the three activities during the same morning.

- **Why do stars shine?** *How do stars obtain their energy to shine ?* was a mystery well into the 20th century. Listening to the preconceived ideas of the students and refuting them, one by one, we reached to explain that the energy production mechanism in stars is the nuclear fusion. Furthermore, we drove students in a tour through the life of stars, paying attention to the nuclear mechanisms active at each stage.

Fig. 2 Students and teacher observing the Sun with our telescopes at the terrace roof of the Astronomy and Meteorology Department

- **Gravitation: Kepler's 3rd Law** Using a Celestia *script* design by DAM members, the students could measure periods and major semiaxis of the orbits of planets and jovian satellites. From these measurements, Kepler's 3rd Law was presented, and then it was used to compute the ratio between Sun's and Jupiter's masses.
- **Sunspots and the activity of the Sun** From the terrace roof of DAM, students observed the Sun with five telescopes and the guidance of several DAM astronomers.
  Firstly, the hazards of an inappropriate observational method were explained. After that, the observation of sunspots and an explanation of the Sun's structure and dynamics, as well as their consequences on the Earth, such as auroras, was undertook.

4 Monitoring of the Workshop

As the number of applicants, the way students responded to our activities was very amazing for us. The *additional activities* we had prepared for students, as a set of questions, to work in class or at home were massively carried out. Just after the activities, the answers to these additional questions were published on our Website, and for a week, the number of visitors to our server grew in 250 per day.

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