



# CREACIÓN DE UN GRUPO DE TRABAJO PARA LA DETERMINACIÓN DE LA VARIABILIDAD DE ESTRELLAS DE TIPO SOLAR

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## Summary

A working group was established in Colombia made up of people from different groups (HOU / GTTP-Universidad de San Buenaventura Medellín / Sociedad Antioqueña de Astronomía / Sociedad Julio Garavito / Parque Explora-Planetario / AstroMAE. The proposal given by the group advances processes of Project Based Learning, doing field work (observations and expeditions), LCO.net teams such as the Faulkes telescopes, the one meter Cerro Tololo and the 40 cm telescopes located all over the world, within the LCO Global Sky program Partner This proposal originated in the one presented by AEGORA of the Complutense University of Madrid, but it is particularized in solar type stars.

## *Context of the research*

In 2009 (International Year of Astronomy), cooperation began between HOU Spain and those responsible for the Galileo Teachers Training Program in Colombia. In 2017, an invitation was extended to participate in a project aimed at teachers, coordinated by the AEGORA Group of the Complutense University of Madrid. It was proposed to use observations from Faulkes telescopes to determine the variability or not of a sample of stars.

The working group created in Colombia chose to study solar-type stars since there are a large number of stars in stellar catalogs whose variability has not yet been determined, although they have been observed on several occasions. Own resources and LCO.net equipment are used, such as the Faulkes telescopes, those of one meter from Cerro Tololo and those of 40 cm located all over the world, within the LCO Global Sky Partner program.

The observation of solar-type stars is important for the knowledge of this set of bodies, since it provides information that can be useful to know the various phases of life of objects similar to the Sun, and can also provide clues regarding the existence of extrasolar planets or stellar activity.

**Para el caso de expedición de Aprendizaje Basado en Proyectos científicos:**

Se presenta una propuesta de caso práctico de estudio y se establecen las colaboraciones necesarias para organizar la expedición y definir los participantes, mayoritariamente maestros.

Se hace observación del fenómeno, por ejemplo el eclipse solar de Chile 2019, desde La Serena, Región IV.

Se analizan los resultados y se presentan en eventos de divulgación como los de la Red de Astronomía de Colombia y profesionales como el Congreso Colombiano de Astronomía y Astrofísica.

**Para el caso de variabilidad de estrellas:**

Se busca información disponible en la base de datos astronómicas SIMBAD <http://simbad.u-strasbg.fr/simbad/> acerca de fuentes que no hayan sido clasificadas previamente con rastros de variabilidad. Magnitudes (UBVRI), tipo de fuente y número de citas.

Se escogen entre estrellas de tipo solar, con magnitud visual menor a 16 que hayan sido observadas muy pocas veces, y en lo posible por parte del International Ultraviolet Explorer.

Se observa por medio de telescopio como los Faulkes, los de un metro de Cerro Tololo y los de 40 cm ubicados por todo el mundo, dentro del programa LCO Global Sky Partner, utilizando filtros disponibles.

Reducción de datos en Salsa J para Fotometría e Imágenes. Uso de software de ofimática libre.

Se determina si se sospecha variabilidad.

Se caracteriza el tipo de variabilidad.

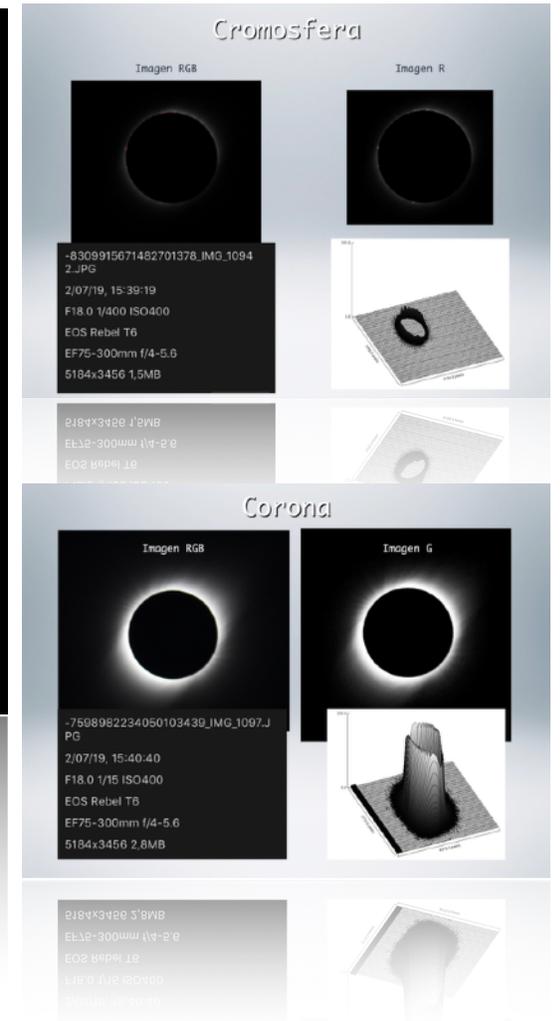
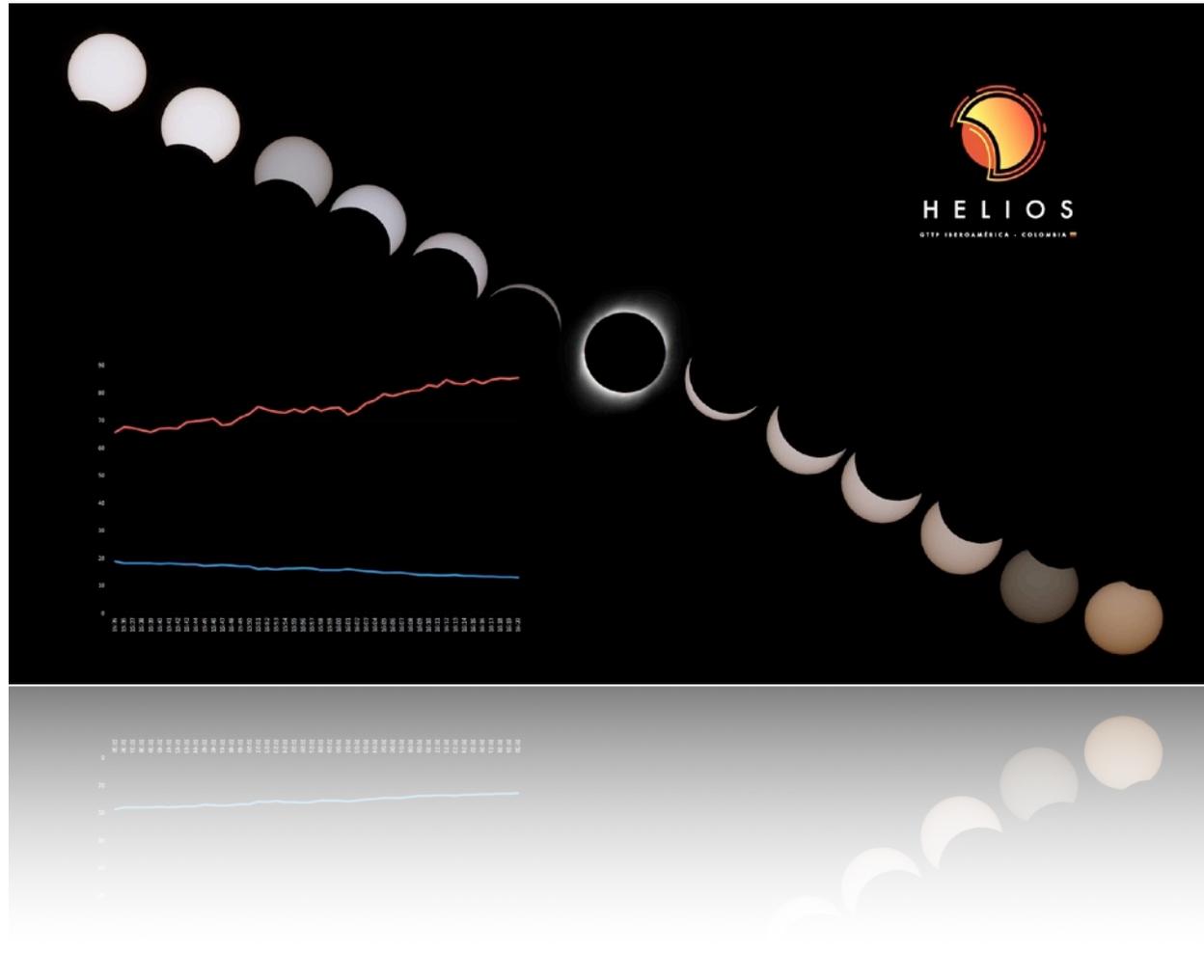
Se presentan los resultados del caso didáctico y astronómico, por medio de eventos o publicaciones.

# EXPEDICIÓN ECLIPSE CHILE 2019

Own resources were used for on-site observations.

Photographic record of temperature and relative humidity was made.

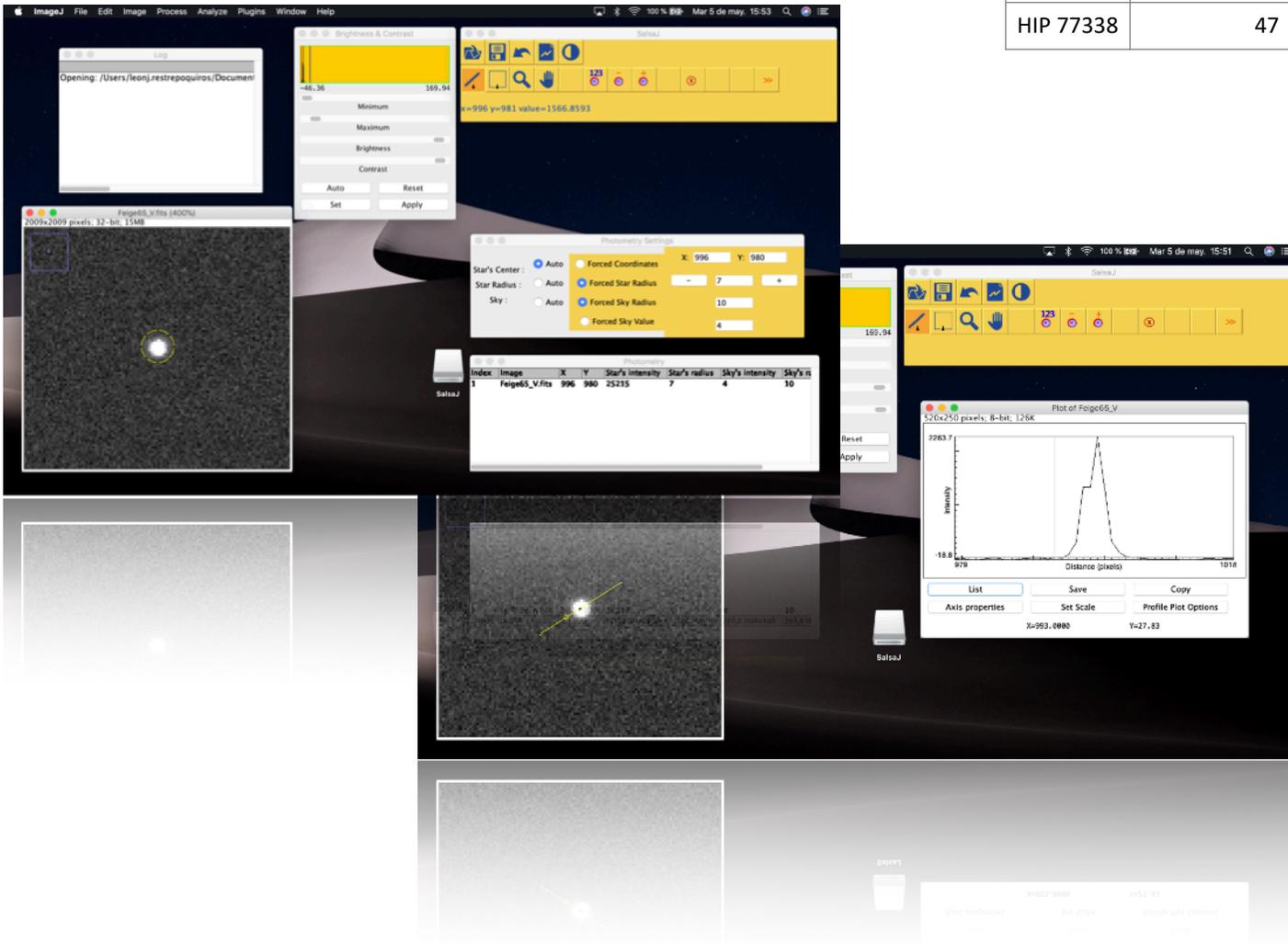
The light profiles of the chromosphere and the crown were studied and the participating teachers presented results in an informative and professional event.



## APRENDIZAJE BASADO EN PROYECTOS

STAR	OBSERVATIONS	FILTER IP	FILTER V	FILTER B	TOTAL IMAGES
HIP 77338	47	54	59	89	202

HIP 77338



The global telescope network was used for the workshop, which contains scheduled observation activities on the LCO portal, using scheduled observations with telescopes located in Australia, the United States, South Africa and Spain.

HIP74788 observations (5 observations) and 47 successful HIP 77338 observations were scheduled.

Photometry was performed with SalsaJ and analysis of results. In this first workshop, the star HIP 77338 located in the constellation Libra was analyzed, to try to determine if it is variable or not, finding indications of variability, for which reason its study will continue.

## *Impact*

Sun observation exercises are easily replicated in schools during the day and to work with students.

The study of solar-type stars is of great interest from an environmental point of view.

Due to its geographical location, it is very important for Colombia to study the direct influence of the Sun on the environment.

## *Prospects for the future*

Generate didactic contents relating the objects of study and astronomy in the focus of IYA2009 and beyond.

Consolidate a network of teachers and groups interested in observational astronomy and space science.

Promote project-based learning.

That participating teachers have access to elements of classical and high-tech observational astronomy, as well as resources from the aerospace sciences.

Facilitate the use of available resources such as planetariums, observatories on land and in space, access to experimentation platforms, multiplatform laboratories, data and resources of high energy laboratories.

Undertake multidisciplinary developments based on space technology.

Promote fieldwork related to astronomy and aerospace science.

Intervene the basic and secondary education curricula related to the topics of astronomy and aerospace science.

Support in reducing the knowledge gap between schools and universities.

Contribute as a community to the achievement of the objectives set by the UN.

Integrate all the disciplines that are required or possible, approaching astronomy not as an end, but as a mediator.