SOL3CAM

Camera for 3D, along the line-of-sight, simultaneous, imaging of the Sun

DURATION

15/12/2015-15/03/2018

BUDGET

149.950 €

PROJECT DESCRIPTION

Our society increasingly depends on the availability of satellites, electrical power grids and radio telecommunications that are very sensitive to space weather events. Better understanding of the physics behind the open problems of space weather and solar physics will lead to a better prediction of geo-effective space weather phenomena.

Several of the most important problems of solar physics are associated with very dynamic phenomena on very small spatial and temporal scales. To tackle these problems, most current instruments are either spectrographs that provide both spatial and wavelength information but need time to complete the observation, or much faster imagers that only provide spatial information for a limited wavelength range. As a result, events that emit at multiple wavelengths and evolve on very short time scales are impossible to observe accurately.

The aim of this project is to produce an optical design that will overcome the limitations mentioned above by simultaneously imaging several very narrow, continuous, wavelengths, thus creating 3D images of the same field of view. It will be based on microlens array technology that has been developed in recent years and has revolutionised many optics applications. Those arrays consist of many miniscule lenses of the same optical and physical characteristics. In solar physics they are used frequently as single lenses to couple light to optical fibres. They are also attached as arrays to detectors to increase their sensitivity by focusing the light to the most sensitive area of each pixel. Here we propose a completely different application of the microlens arrays technology in conjunction with a Fabry-Pérot filter. This combination can replace the need for the collimating and convex lenses and provide new-found capabilities for 3D imaging of solar phenomena. Additionally, given the expected low complexity and off-the-shelve components, the design is anticipated to be cost-effective and deployable in instruments used for space weather monitoring.

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CONTACT INFORMATION

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