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Aristotle University Astronomical Station at Mt.Holomon

Avdellidou Ch.[1], *Ioannidis P.*[1], *Kouroubatzakis K.*[1], *Nitsos A.*[1], *Vakoulis J.*[1], *Seiradakis J.H.*[1]
[1]Aristotle University of Thessaloniki, Department of Physics, Section of Astrophysics, Astronomy and Mechanics, GR-541 24 Thessaloniki, Greece

Abstract: The Aristotle University Astronomical Station was established seven years ago in order to fulfil the educational needs of its students. Astronomical observations are undertaken using three fully equipped small telescopes. Some interesting results are presented below, including the study of asteroids and flare stars, the detection of optical emission from supernovae remnants and follow up observations in extrasolar planets.

1 Instrumentation

Most observations in this work were undertaken during 2010-2011. Two complete astronomical systems were used: (a) A Takahashi 180ED Astrograph of 180 mm diameter and f/2.8 focal length mounted on Orion Atlas EQ-G with a Fingerlakes Pro Line 6303E camera of 3.1×2.1 deg^2 FoV. (b) An 11″ Smidt-Cassegrain Celestron f/10, mounted either on a Skywatcher EQ-6 Skyscan or on a CGE PRO Celestron, with an Atik 4000 CCD camera of 1×1 deg^2 FoV. A reducer was used in order to achieve a focal ratio of the order of f/6 and a set of UBVRI Bessel filters.

2 Calculation of the rotational period of inner main belt asteroids

The main goal of the project is the extraction of the light curves and the calculation of the rotational period of asteroids in order to study their properties. The targets were selected according to their magnitude and the quality of their existing light curves. As a result we observed parts of the period of (478) Tergeste, (664) Judith, (266) Aline [1], (Fig.1) and (426) Hippo. The observation were undertaken with the 11″ Smidt-Cassegrain Telescope using the R-Bessel filter during moonless nights of spring and summer 2010. Data reduction and photometry were done using MPO CANOPUS.

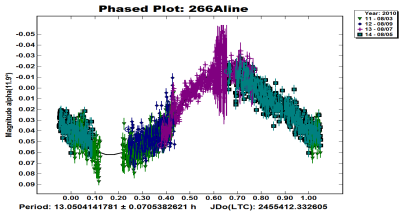

Figure 1: Composite LC of 266 Aline

3 Deep optical CCD observations of supernovae remnants

The purpose of the project was to observe, in optical wavelengths, supernovae counterparts of already known radio remnants [2]. For SNR G82.2+5.3, in Cygnus, there is a stack of 3 exposures of 1200 sec giving a combined total of one hour exposure through a narrow band oxygen filter. Also one exposure of 1200 sec through the

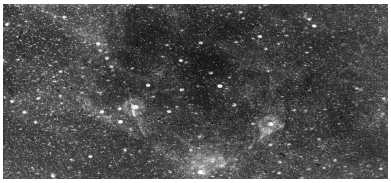
Figure 2: SNR G82.2+5.3 (RA:20 19 00, DEC:+45 30 00)

strömgren y filter was used in order to achieve proper continuum subtraction. The image reveals filamentary emission in the west and east areas of the image as well as diffuse emission (Fig.2). The two basic filamentary structures define the opposite sides of an ellipsoidal shell. The observations were undertaken on the 13^{th} and 14^{th} of July 2010.

4 Monotoring of flare stars

Light curves of the M4.5e flare star EV Lac (RA: 22 46 49.73 DEC: +44 20 02.35) are presented. BD+43 4303 and BD+43 4304 were used as comparison stars. The observations were carried out on 20/07/2010, 23:28 - 25:57 UT , 28/07/2010, 22:10-25:28 UT , 29/07/2010, 19:40-25:32 UT and 12/07/2011, 20:42-24:25 UT. During the last day a strong flare of Δm=0.55 mag was observed with the Bessel B filter (Fig. 3). The equivalent magnitude with the Bessel V filter was Δm=0.25 mag. Further observations are underway, in order to continue the Stefanion Observatory earlier studies of this star [3].

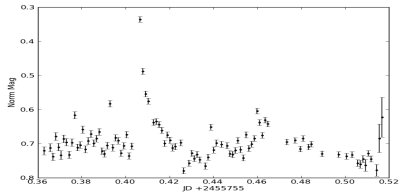

Figure 3: The flare of EV-Lac at 12^{th} of July 2011.

5 Follow up observations of extrasolar planets

The purpose of this project was to study in detail the lightcurves of well known extrasolar planets in order to investigate peculiarities in their orbits. With follow up observations we detected two extrasolar planets CoRoT-2b (R.A: 19 27 06.52 DEC: +01 23 01.7) (Fig 4) and XO-3b (RA: 04 21 52.71 DEC: +57 49 01.89). The anomaly of the CoRoT-2b light curve which can be seen at $\simeq$ 2455391.417 JD (Fig.4), was probably caused by a spot on the host star [4]. The observations took place on 13/07/2010 and 23/10/2010 respectively. The data reduction, photometry and final plot of the light curves were performed with the ThReT pipeline and C-MUNIPACK.

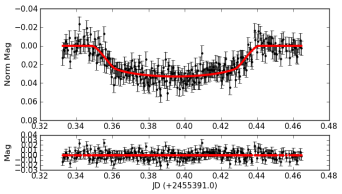

Figure 4: CoRoT-2b

6 Seeing and meteorological measurements

In order to determine the weather conditions of Mt. Holomon and the turbulence of the atmosphere we continuously make additional seeing and meteorological measurements. Seeing measurements, using the DIMM method, have been carried out since 2003 . After 44 hours of observations on July 2009, a mean value of 1.15 arcsec has been obtained, which is larger than previously published values [5].
Since March 2010 a weather station was installed near Astronomical Station, monitoring every hour temperature, humidity, dewpoint, precipitation, wind speed and wind direction. We can understand from the measurements, that there is seldom frost in the Holomon Astronomical Station's area.

References

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