

Short Term Scientific Mission DETAILS:

COST Action: MP1304

STSM title: *Correlated optical/X-ray variability of accreting X-ray pulsars*

COST STSM Reference Number: ECOST-STSM-MP1304-150714-047821

Period: from 15-07-2014 to 23-07-2014

STSM type: Regular (from Greece to Spain)

Visitor: Pablo Reig, Foundation for Research & Technology-Hellas

Host: Astronomical Observatory University of Valencia, Valencia, Spain

STSM SCIENTIFIC REPORT

Heraklion 2 August 2014

The purpose of my visit to the Astronomical Observatory of the University of Valencia was to strengthen the current collaboration on accretion-powered pulsars between the Skinakas Observatory of the University of Crete (Greece) and the Astronomical Observatory of the University of Valencia (Spain). The main goal of the project is to facilitate the photometric monitoring of the optical counterparts to high-mass X-ray binaries.

During my stay in Valencia I worked with Prof Juan Fabregat on two sides of the problem:

1) Reduce and analyse all photometric campaigns performed from the Skinakas observatory during the period 2000-2013.

2) Search for correlations between the optical and X-ray (outbursts) variability.

1. Photometric observations. We finished the reduction and re-analysis of all CCD images taken of the optical counterparts to high-mass X-ray binaries and derived the photometric magnitudes of a large number of stars in the vicinity of the targets. The main goal is to identify non-variable stars that can be used as secondary standards. This will allow us to perform *relative photometry*, reducing the amount of observing time.
2. Correlated optical/X-ray variability. The circumstellar disk around the Be star's equator is the main source of variability both in the optical, because the disk itself emits in the visual and IR bands, and of the X-ray band because it constitutes the main source of matter available for accretion onto the neutron star. We would expect then a correlated behaviour. In general, we observed that the source shines bright only when the disk is present and well developed. However, we also found some peculiar behaviour: large X-ray outbursts when the disk is small, and large disks sizes with no X-ray activity.

We expect to finish this work in the form of a paper and be able to submit it in the next few weeks.

My collaboration with the host institute does not restrict to the study of accreting X-ray pulsars but include other projects. We are currently collaborating on the search for Non-radial pulsations in Be/X-ray binaries and the characterisation of the long-term optical and infrared variability of isolated and Be binaries. Thus, the collaboration will continue in the future on these and other projects.

Pablo Reig

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