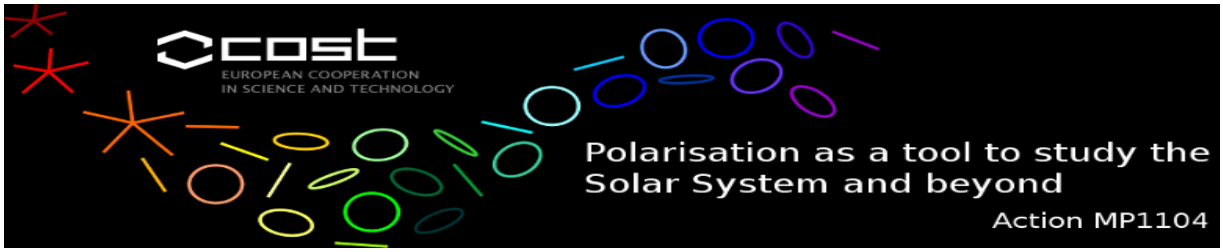

STSM Scientific Report Template

Applicant and home institution : Dr. Agnieszka Słowikowska

Visited scientist and host institution : Dr. Pablo Reig, Foundation for Research and Technologu – Hellas / University of Crete, Heraklion, Greece

Dates of STSM: 24.08.2013 – 07.09.2013

Explain briefly below how your STSM matched one of these key-points :

1. strengthen current collaborative projects
2. establish new collaborations
3. obtain necessary knowledge for the application of new techniques
4. use host infrastructures that are not available at the home institute.

My visit at University of Crete had two main goals. First was to strengthen scientific collaboration between our group and Cretean astrophysics group, especially Dr. Pablo Reig and Dr. Andreas Zezas.

I was post-doc at University of Crete in 2007-2009, and therefore such a visit helped me to keep collaboration that was established during my fellowship.

Second very important goal was to meet people form University of Crete that are involved in the RoboPol project: Dr. Vasiliki Pavlidou, Dr. Kostas Tassis and Dr. Dmitry Blinov. Additionally, learning about the recently commissioned RoboPol polarimeter as well as performing polarimetric observations of X-ray binaries and the Crab pulsar.

Describe below the activities carried out during the STSM and the main results obtained.

My main activity was connected with polarimetric observations and data analysis of a few selected high mass X-ray binaries with Be stars. Together with Dr. Pablo Reig and Dr. Krzysztof Krzeszowski we got eight hours of observing time at the Liverpool Telescope (LT). We have already performed observations at LT with Ringo3 polarimeter of two high-mass X-ray binaries: LS I +61 303 and KS 1947+300 in three colors: red 770-1000 nm, green: 650-760 nm and blue: 350-640 nm. During my stay in Crete we performed a preliminary analysis of the LT data. Additionally, we performed polarimetric observations with the RoboPol polarimeter. RoboPol is a new instrument working at 1.3-m telescope at Skinakas Observatory, Crete, Greece. The main optical part of the RoboPol is a double Wollaston prism that produce four images of the source with orientations of 0, 45, 90, 135 degrees that allow to measure optical linear polarization. Main goal of the RoboPol project is to monitor blazars. We observed the following high-mass X-ray binaries with RoboPol: 4U 0115+634, IGR J21342+4738, GRO J2058+40, KS 1947+300, SAX J2103+4545 and V 0332+53. Obtained data have been already analysed. These sources are polarized on the level of from 1% up to 4%. We have set up a new collaborative project to study the long-term variability of Be/X-ray binaries with RoboPol. We will continue polarimetric observations of these targets for the next months, with LT/Ringo3 and RoboPol, to cover their full orbital periods that extend from 24 to 40 days. After finishing scheduled observations we will check the dependence of the position angle and polarization degree as a function of the orbital phase to obtain the inclination angle of these systems.

Additionally, we observed the Crab pulsar and got results that are in very good agreement with the recently published HST observations by Moran et al. 2013. I will propose to observe the Crab source in October and November 2013 with Robopol. It is especially interesting in context of its recently increased activity in the X-ray and gamma-ray regime. Such optical polarimetric observations will be complementary to multi wavelength observations that are conducted with different instruments.

During my STSM we discussed other possible projects that could fit the capabilities of RoboPol. We agreed that other interesting targets for polarimetric studies are white dwarfs, isolated white dwarfs with discs, as well as low mass X-ray binaries, especially black widow systems (BWs) and redbacks (RBs). 10% of white dwarfs are magnetised WDs and thus we expect them to have high polarization degree. The BWs and RBs show some discs/shell/bow shock therefore we can expect them to have some level of polarization degree as well.