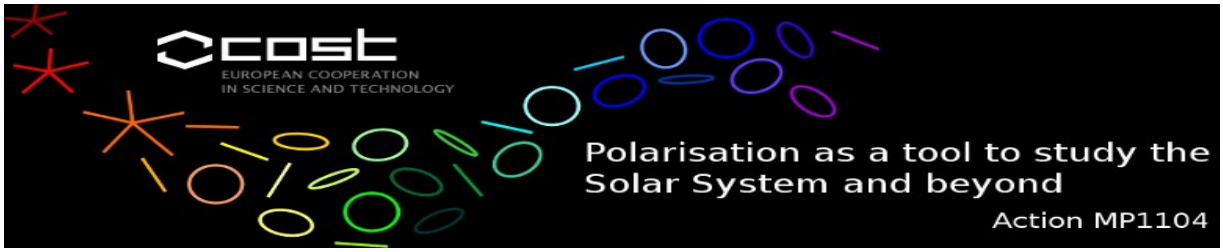

STSM Scientific Report

Applicant and home institution : Sudeshna Boro Saikia, IAG, Goettingen University

Visited scientist and host institution : Julien Morin, LUPM, Université de Montpellier, France

Dates of STSM : 19-07-2015 to 25-07-2015

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

My PhD thesis is on investigating magnetic cycles of stars using spectropolarimetric data. The data is collected as part of the BCool collaboration at the NARVAL spectropolarimeter at TBL. Dr Morin is also a member of the collaboration and is an expert on the spectropolarimetry of cool stars.

61 Cyg A , which was the target of our analysis is part of the well known binary 61 Cyg. Our recent results establishes 61 Cyg A as the only cool star with solar-type polarity reversals of the large-scale field. In Montpellier we worked on the paper summarising our results. We also started collaboration on a new topic which studies the impact of the large-scale magnetic field on radial velocity signals.

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

During my stay in Montpellier I worked closely with Dr Morin and during my one week stay we carried out the following task:

(1) The data used in our analysis was taken as part of the BCool collaboration and we analysed five epochs of data with some very interesting results.

(2) 61 Cyg A is the first detection of solar-like polarity reversals of the large-scale magnetic field.

(3) We also detected a possible anti-correlation between the longitudinal field and chromospheric activity of 61 Cyg A.

(4) We had discussions on the implications of the results and Dr Morin gave some valuable input on the paper. The paper will be submitted in the coming weeks.

(5) We also started working on a new project which uses the results from our current analysis of 61 Cyg A's data. In this new project we use the large-scale field reconstructions of 61 Cyg A and investigate how this field impacts the radial velocity signals over its activity cycle. The activity cycle of 61 Cyg A is 7 years.

(6) This technique will be used on other BCool targets (F,G,K stars) wherever multiple epochs of observation is available.