COST Action MP1104
Short Term Scientific Mission

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Host: Stefano Bagnulo, Armagh Observatory (United Kingdom)
Period: 14/11/2013 – 30/11/2013
Reference Code: COST-STSM-ECOST-STSM-MP1104-141113-032522

SCIENTIFIC REPORT

The goals of this STSM were to go deeply into the details of calibration of polarimetric measurements, and to better understand how to derive physical characteristics of dust particles from the observational data.

We studied in details the instrumental effects over the polarization measurements of the 2-channel Focal Reducer (FoReRo2) at the 2m Telescope at National Astronomical Observatory (NAO) Rozhen in its polarimetric mode of observations. I understood in details the so called "beam swapping technique" in polarimetric observations, which includes swapping positions of ordinary and extraordinary beams produced by Wollaston prism and with clever mathematical technique to eliminate the instrumental effect. I applied it to the observations obtained prior to the STSM and the instrumental effect decrease in more than an order of magnitude – from 2.2% to 0.1% for linear polarization. These observations took a lot of time because we need to rotate the whole focal reducer at 45 degrees covering the positional angles from 0 to 315 degrees. The easiest way is to use achromatic true zero-order waveplate with $\lambda/2$ and/or $\lambda/4$ retardation.

The opportunity for buying such a waveplate was the main discussion with Armagh Observatory director (Mark Bailey) and will be a part of our future collaboration between our two institutions focused mainly in polarimetric observation but also in PhD students exchange visits.

During our discussions the idea for future common scientific investigation comes into sight – polarization of comets molecules using spectropolarimetric observations. We start discussion of data reduction and measurements techniques and problems using old data and will plan new observation in near future.

I made the presentation "Possibilities of the 2m telescope and FoRoRo2 at NAO Rozhen for polarimetric and spectropolarimetric observations" at the seminar of the Armagh Observatory.