# COST Action MP1104
# Short Term Scientific Mission

Reference Code: COST-STSM-ECOST-STSM-MP1104-070712-019160
Beneficiary: Luca Belluzzi, Instituto de Astrofisica de Canarias (Spain)
Host: Silvano Fineschi, INAF - Osservatorio Astrofisico di Torino (Italy)
Period: 07/07/2012 - 14/07/2012

## SCIENTIFIC REPORT

As explained in the working plan, the applicant of this STSM and the host group at the INAF - Osservatorio Astrofisico di Torino (OATo) are presently undertaking a scientific collaboration with the aim of investigating the magnetism of the solar corona through the analysis of the scattering polarization and the Hanle effect in coronal forbidden lines.
While the host group has a long term expertise in the investigation of the solar corona, with particular emphasis on the development of new instrumentation, and on the interpretation/modelling of the physical processes revealed by the available observations, the applicant is familiar with the density-matrix theory of polarization, required for the modelling of the scattering polarization and the Hanle effect in the coronal forbidden lines.
Key point of this collaboration is the forthcoming availability of new data in the forbidden FeXIV green line through the polarimeter recently developed by the host group at the OATo.

The main objective of this STSM was to offer the opportunity of a first direct contact between the applicant and the host group. The mission was in this sense extremely fruitful, since it allowed (1) to clarify the state of the art of instrumentation, observations, modelling, and theory concerning the physical problem under investigation; (2) to define a detailed working plan for the next 3/4 months both for the applicant and for the host group, and (3) to move the first steps towards the first planned objectives.

These are in detail the topics discussed and the results achieved:

1)Definition of a precise set of open problems and interesting phenomena to focus the attention on.

2)Analysis of the observational data already available.
The attention was mainly focused on the observations provided by the CoMP instrument of the High Altitude Observatory (USA) in the forbidden FeXIII IR line (observations available on the web). The availability of such data is particularly useful at this stage of our work since (1) they can already be used for investigating the selected phenomena by applying the available numerical codes to different models of the solar corona; (2) they will represent a precious reference once the new instrumentation of the OATo will start providing new spectropolarimetric data in the forbidden FeXIV green line.

3)Definition of the coronal models necessary for the investigation of the selected phenomena.

4)Familiarization with the FORCOMP code developed at the High Altitude Observatory (USA),

which performs forward modelling of the scattering polarization and the Hanle effect in the forbidden FeXIII IR line. This code will be initially applied for the investigation of the selected phenomena by using suitable coronal models, and the available observations performed by the CoMP instrument. As a second step, it will be suitably modified in order to perform forward modelling in the forbidden FeXIV green line.

As previously mentioned, a detailed working plan for the next 3/4 months has been defined. Thanks to a recently approved STSM, requested by Dr. Lucia Abbo and Dr. Alessandro Bemporad of the OATo, a new meeting will take place next October at the Instituto de Astrofisica de Canarias.