

Report on a visit to IAPS
By Prof. V. Zharkova
In 28 July – 3 August 2013
Project:
X-ray solar flare polarimetry
from modelling to space experiment

This visit of **Prof. V. Zharkova** , Department of Mathematics, University of Bradford, (from 01/09/13 - University of Northumbria, Newcastle) UK was supported by the COST Action MP1104 "Polarization as a tool to study the Solar System and beyond to work with **Dr. Paolo Soffitta** and his group from the *host institution*: Istituto Di Astrofisica e Planetologia Spaziali (IAPS), Rome, Italy.

This visit was carried as planned and used the opportunity to explore the existing theoretical developments by V. Zharkova and team of the most realistic simulations of hard X-ray polarization from solar flares caused by energetic particles and detected in different positions of flares on the solar disk and the experimental designs of the solar HXR polarimeter based on photoelectric effect and Compton scattering developed at IAPS, Italy. We also explored the options of supporting observations of emission and polarization in microwave (MW) radio emission and H-alpha emission in solar flares where Prof. Zharkova has also a number of papers providing theoretical mechanisms for interpretation of the observed polarization that can be complementary to that in hard X-ray. This visit established a new collaboration allow both teams to ‘obtain necessary knowledge for the application of new sensitive techniques’. This visit laid the foundation of the future collaboration between scientists of the UK and Italy working on the HXR polarimetry that will be strengthening the Europe's scientific networking capacity in the field of polarimetry proposing space experiments in forthcoming mission calls.

The schedule of the visit

Monday, 29th of July

Introduction to the research activity carried out at INAF-IAPS institute about X-ray polarimetry to define the context of the scientific objectives of the COST STSM.

Tuesday, 30th of July

Introduction to the research activity carried out by Prof. Valentina Zharkova and her group in the solar flare X-ray polarimetry, and its association with microwave (MW) emission.

Wednesday, 31st of July

Discussion of theoretical aspects for possible proposals of solar flare polarimetry X-ray missions. Prof. Zharkova delivered a talk ‘HXR polarisation in solar flares: theory versus observation’, which inspired an interesting discussion of physical mechanisms causing solar flares and their diagnostics from HXR and MW emission and polarization. H-alpha line polarisation in solar flares was also discussed.

Thursday, 1st of August

Discussion of the key issues of observational aspects for possible proposals of the solar flare polarimetry X-ray missions. A talk on ‘Diagnostics of energy and particle transport from lower energy optical emission and sunquakes’. This was followed by further discussion of implications of solar flares and coronal mass ejection on the solar atmosphere, interior and heliosphere.

Friday, 2nd of August

Summary of findings and discussion of the joint points for collaboration and future interaction on the project.