The activities of ***the Astronomical Institute of the Slovak Academy of Sciences (AISAS)***, Tatranská Lomnica (http://www.astro.sk), related to COSPAR, were devoted to the research in solar and stellar physics using different satellite observations, mainly in the UV, XUV and X-ray spectral regions. Stellar data of the IUE, FUSE, INTEGRAL satellites, and the HST were used for research of various variable stars [1,4]. Data of the current SOHO mission, the TRACE and the RHESSI satellites and previous satellites of the NOAA and GOES series were used for solar research [3,6,7,8]. Some other studies were focused on the solar activity with respect to the solar cycle and its influence on the heliosphere using the ground-based data [5] or on the possible interstellar meteors around the Earth [2]. Hereby we present some examples of the results obtained by the AISAS staff, an information on two education activities of the AISAS and a more extensive list of paper published by the AISAS staff related to the COSPAR activities.

Within the research of the stellar astrophysics, the data carried out with the space observatories, the X-ray Multi-Mirror Telescope (XMM-Newton), the Far Ultraviolet Spectroscopic Explorer (FUSE) and the Hubble Space Telescope (HST), were used to model the spectral energy distribution (SED) of symbiotic X-ray binaries (SyXBs). These exotic binaries comprise a cool giant or supergiant as the donor star and a white dwarf or neutron star as the accretor. Radiation of SyXBs dominates both the supersof X-ray and the far-UV domain. A fraction of the hot star energy is reprocessed into the thermal nebular emission, dominating the spectrum from the near-UV to longer wavelengths, and the donor star contributes significantly into the optical/near-IR (see Fig.~1). Therefore, to understand the nature of these objects, a multiwavelength approach in modeling their spectra is essential. First results on multiwavelength modeling the SED of SyXBs were presented at the conference on "Evolution of Compact Binaries" held at Vina del Mar, Chile 6-11 May 2011. Using own method of disentangling the composite spectra, fundamental parameters of individual radiative components were determined for a SyXB LIN~358 in the Small Magellanic Cloud (see Fig. 1). [4]

Intermediate polars (IPs) are a major fraction of all cataclysmic variables detected by INTEGRAL in hard X-ray. These objects have recently been proposed to be the dominant X-ray source population detected near the Galactic centre, and they also contribute significantly to X-ray diffuse Galactic ridge emission. Nevertheless, only 25% of all known intermediate polars have been detected in hard X-ray. We used all observational data from INTEGRAL/JEM-X and INTEGRAL/IBIS to study possible variability of the selected IPs (V1223 Sgr and V709Cas) in the hard X-ray and soft γ-ray spectral bands. In addition,

observations from INTEGRAL/OMC data were used to look for long-term variability of these objects in optical band. Our analysis showed that the fluxes of these IPs are long-term variable, mainly in the (15–25) keV and (25–40) keV bands. Moreover this hard X-ray/soft γ-ray variability is correlated with the changes in the optical spectral band in the case of V1223Sgr. Our analysis revealed a deep flux drop around MJD ≈ 53 650 observed in both the X-ray as well as the optical band for this IP. [1]

A very close space around the Earth has been investigated by work performed in the Insterstellar department of the AISAS. The analysis of the 14 763 precise determined meteor orbits collected in the Japanese TV catalogue has called the occurence of interstellar meteoroids in the vicinity of the Earth into question, at least for meteoroids of masses corresponding to the video technique detections. The hyperbolic excesses of the heliocentric velocities were found in all cases about one order lower than required from the velocity distribution of neighbouring stars. The upper limit of the proportion of possible interstellar meteors to interplanetary ones among all investigated meteor orbits was determined to be 1.3×10^{-3}. [2]

We studied chromospheric evaporation mass flows in comparison with the energy input by electron beams derived from hard X-ray (HXR) data for the white-light M2.5 flare of 2006 July 6. The event was captured in high-cadence spectroscopic observing mode by SOHO/CDS combined with high-cadence imaging at various wavelengths in the visible, extreme ultraviolet, and X-ray domain during the joint observing campaign JOP171. During the flare peak, we observe downflows in the He I and O V lines formed in the chromosphere and transition region, respectively, and simultaneous upflows in the hot coronal Si XII line. The energy deposition rate by electron beams derived from RHESSI HXR observations is suggestive of explosive chromospheric evaporation, consistent with the observed plasma motions. However, for a later distinct X-ray burst, where the site of the strongest energy deposition is exactly located on the CDS slit, the situation is intriguing. The O V transition region line spectra show the evolution of double components, indicative of the superposition of a stationary plasma volume and upflowing plasma elements with high velocities (up to 280 km s^{-1}) in single CDS pixels on the flare ribbon. However, the energy input by electrons during this period is too small to drive explosive chromospheric evaporation. These unexpected findings indicate that the flaring transition region is much more dynamic, complex, and fine structured than is captured in single-loop hydrodynamic simulations. [7]

The north-south asymmetries (NSA) of three solar activity indices are derived and mutually compared over the period of more than five solar cycles (1945 - 2001). A catalogue of the hemispheric sunspot numbers, the data set of the

coronal green line brightness developed by us, and the magnetic flux derived from the NSO/KP data (1975-2001) are treated separately within the discrete low- and mid-latitude zones (5-30, 35-60). The calculated autocorrelations, cross-correlations, and regressions between the long-term NSA data sets reveal regularities in the solar activity phenomenon. Namely, the appearance of a distinct quasi-biennial oscillation (QBO) is evident in all selected activity indices. Nevertheless, a smooth behavior of QBO is derived only when sufficient temporal averaging is performed over solar cycles. The variation in the significance and periodicity of QBO allows us to conclude that the QBO is not persistent over the whole solar cycle. A similarity in the photospheric and coronal manifestations of the NSA implies that their mutual relation will also show the QBO. A roughly two-year periodicity is actually obtained, but again only after significant averaging over solar cycles. The derived cross-correlations are in fact variable in degree of correlation as well as in changing periodicity. A clear and significant temporal shift of 1-2 months in the coronal manifestation of the magnetic flux asymmetry relative to the photospheric manifestation is revealed as a main property of their mutual correlation. The reliability of the derived results was confirmed by numerical tests performed by selecting different numerical values of the used parameters. [5]

The Astronomical Institute organised in the year 2010 the lecture course - Modern Developments in Solar and Stellar Spectroscopy - given for the undergraduate and PhD studes from Slovkia, Czech republic, Poland by Prof. Kenneth Phillips, visiting professor of the Mullard Space Science Laboratory, affiliated with the University College London (UK) on May 17-21, 2010 at AISAS at Tatranska Lomnica. The course was focused on the basics of atomic physics and spectroscopy, spectra of the photosphere and chromosphere, and especially of the solar and stellar corona. The lectures aimed at showing how spectroscopy can be applied to determine physical properties (densities, temperatures, etc.) of solar coronal plasma as observed by SOHO, Hinode, and other currently available instruments on-board space-borne satellites. In total more than 20 students took part in the course, and some staff members of the AISAS attended selected lectures. More details about the course of lectures can be found at the web page of the course - *http://www.astro.sk/~choc/open/10_kp_spec/10_kp_spec.html* .

In the year 2012 another summer school was co-organized by the AISAS in its headquarters. The ISWI-Europe Summer School in Space Science at Tatranska Lomnica on August 21-27. The ISWI is a follow-up activity to the successful IHY 2007 but focusing exclusively on space weather. European scientists are successfully participating in the ISWI and many research level scientific

instruments have been installed in many parts of Europe in the framework of the IHY and ISWI. In order to make maximum use of these and other similar initiatives and establish strong space research groups in Europe, a high level training of young students and researchers is very crucial. The summer school major objectives included teaching the fundamental knowledge and skills in space physics focuses on all research related mostly to the space weather. 46 students from 26 countries have taken part while to the total number of participants was 76. More details about the summer schools can be found at the web page of the school - *http://stara.suh.sk/id/iswi/ISWI_School2011.htm*.

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Figures:

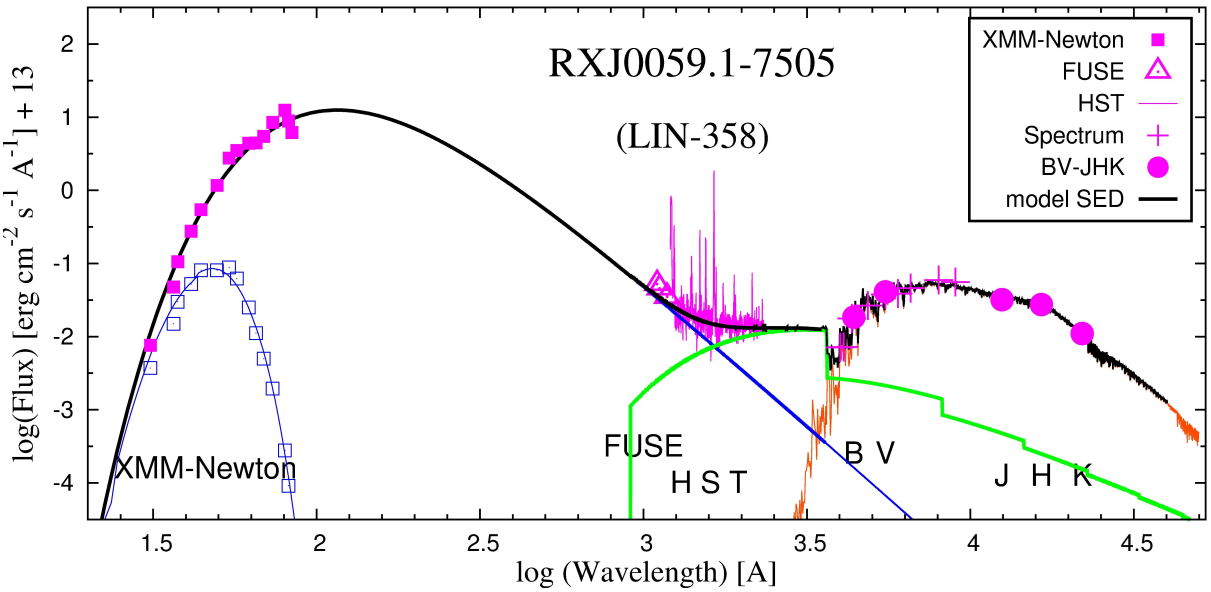

Fig. 1. A comparison of the measured (in violet) and modeled (heavy black line) SED of the symbiotic X-ray binary LIN~358 in the Small Magellanic Cloud.

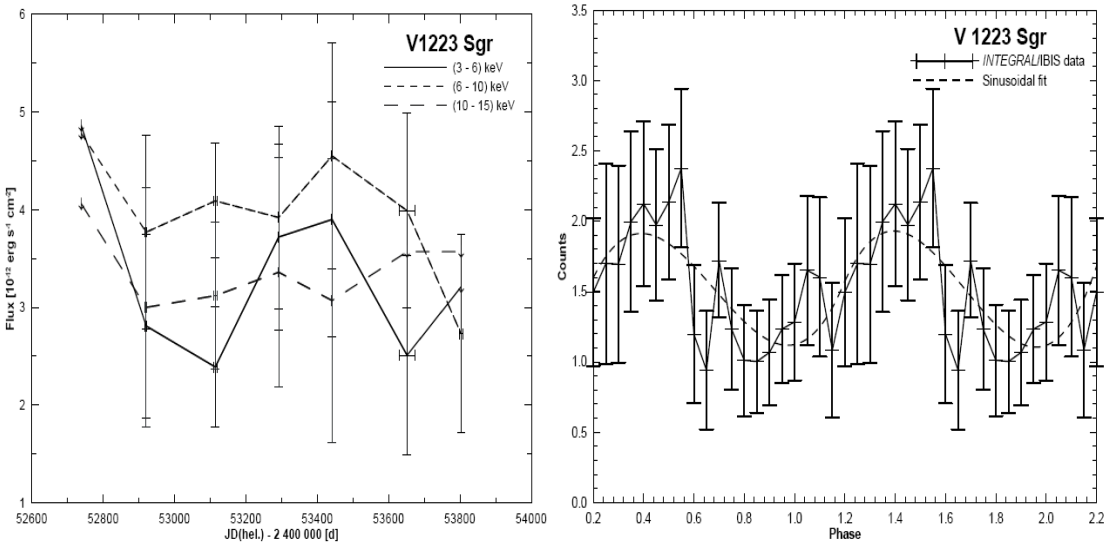

Fig. 2. Left panel: INTTEGRAL/JEM-X flux curves of V 1223 Sgr in the corresponding energy bands. The arrows represent 3 sigma upper limits. Right panel: INTEGRAL/IBIS phase diagram of V 1223 Sgr in (15-25) keV band floded with oprbital period (3.37 hrs).

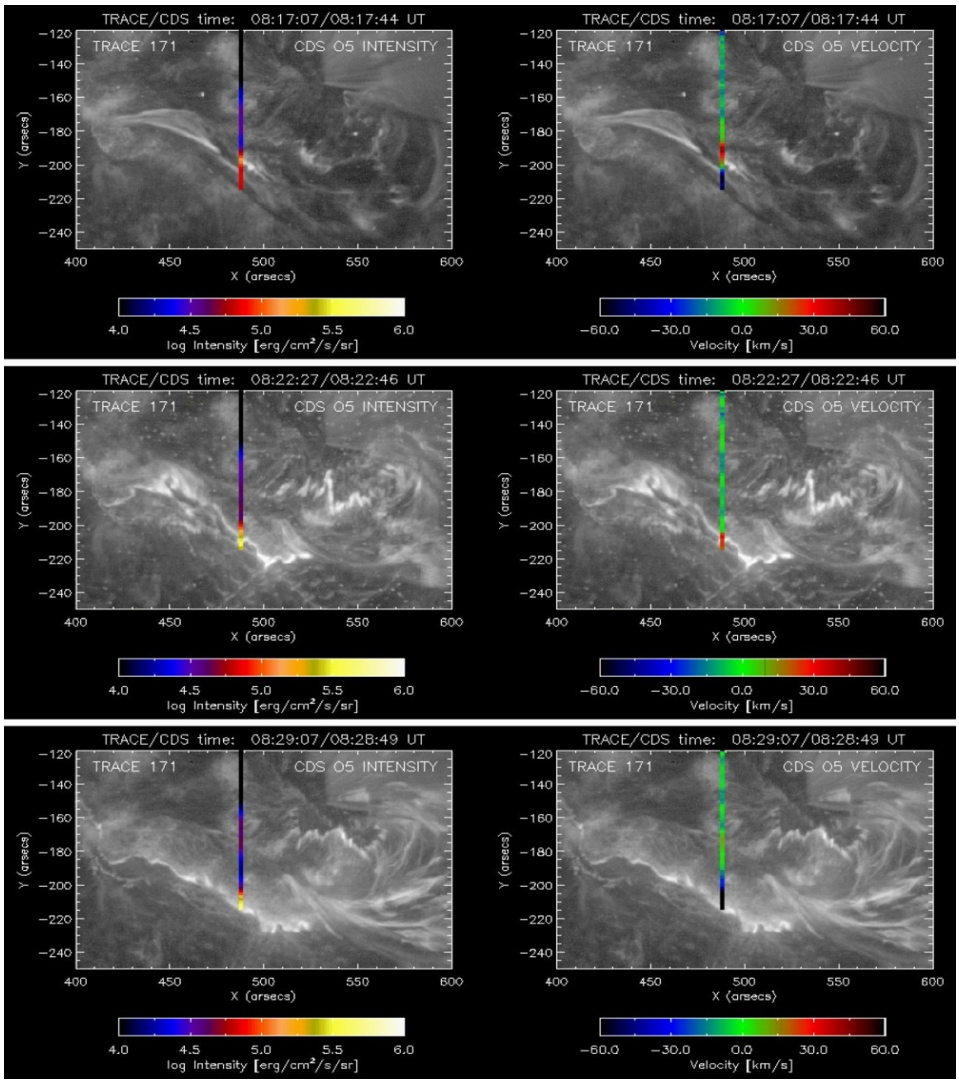

Fig. 3. Three snapshots of TRACE 17.1 nm images combined with the integrated intensities (left) and velocities (right) derived from the Gaussian fit to a co-temporal CDS spectrum in the O v line for the white-light M2.5 flare of 2006 July 6.. The top panel is taken during the time of the filament lift-off and commencement of the impulsive flare brightenings, the middle panel around the time of the highest HXR peak, and the bottom panel during the time of the distinct late RHESSI peak associated with the strongest transition region upflows at the CDS pixels crossing the flare ribbons.