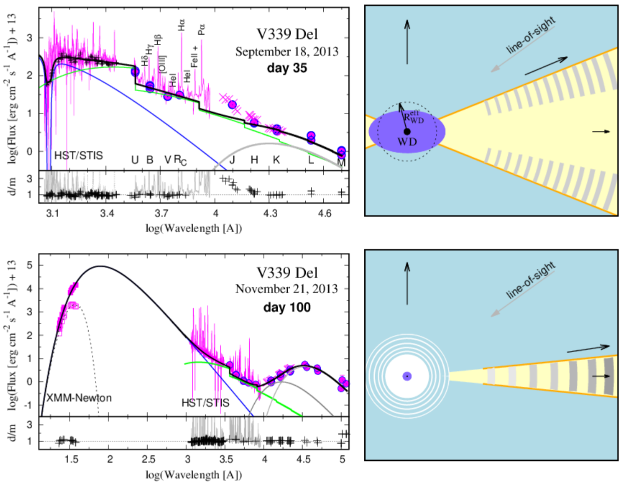
The activities of ***the Astronomical Institute of the Slovak Academy of Sciences (AISAS)***, Tatranská Lomnica (*www.astro.sk*), related to COSPAR, were devoted to research in stellar, solar, and interplanetary physics using different satellite observations, mainly in the UV, XUV and X-ray spectral regions. Stellar data of the XMM-Newton, MOST, and Kepler satellites, including the HST were used for research of various variable stars and start hosting exoplanets [2-8]. Data of the current SDO, IRIS, STEREO, ACE, and other satellites were used for solar research mostly focused on solar prominences and flares. In common, these data were used with the simultaneously acquired data by the ground-based solar telescopes [9-15]. Topic of the interstellar particles has been also addressed [1]. Hereby we present some examples of the results obtained by the AISAS staff.

Observations carried out with the space observatories, the European Space Agency's (ESA) X-ray Multi-Mirror Mission (XMM-Newton) and the Hubble Space Telescope (HST), were used to model the spectral energy distribution (SED) of the classical nova V339 Delphini, which exploded on August 14, 2013 (= nova age 0) [8]. Using our original method of multiwavelength modeling the nova spectrum, we revealed new striking results: (i) At the nova age of 35 days, the WD photosphere was oblate in poles and a slow equatorially concentrated mass-outflow contained dust grains. (ii) From day 35 to 72, the nova significantly stopped-down the mass-outflow. (iii) On day 100, the co-existence of the strong dust emission and the luminous high-temperature WD confirmed the disk-like formation around the WD, where the dust can spend a long time. (iv) Our modeling revealed highly super-Eddington luminosity of the burning WD lasting, at least, for the first 100 days of the nova life. Figure 1 shows a sketch for the nova ejecta as can be inferred from our SED models on days 35 and 100. This finding represents a new challenge for theoretical modeling of the nova phenomenon.

Figure 1. Left: Observed spectrum of the nova V339 Del (in magenta) and its model (black



line). The model consists of the radiation from the WD (blue line), nebula (green) and dust (gray). Right: Sketch for nova ejecta. The WD pseudophotosphere is in dark-blue, stellar wind in light-blue, equatorially concentrated outflow with dust in yellow with gray strips and bow shocks as orange lines. The white array represents stopping-down the wind from the WD indicated on day 100 of the nova age.

The X8.2-class solar flare SOL2017-09-10T16:06 ranks as the second most energetic flare in the solar cycle 24. This major eruptive event happened at the western solar limb and triggered a very fast coronal mass ejection followed by significant space weather and heliospheric effects including a solar energetic particles event detected also as ground level enhancement. The flare displayed an extended arcade of flare loops, being detected in the range of temperatures from X-rays down to cool chromospheric-like plasmas. While hot flare loops with temperatures of $10^6 - 10^7$ K were observed in the EUV channels of the Atmospheric Imaging Assembly (Figure 2) aboard the Solar Dynamics Observatory (SDO/AIA), cool loops with temperatures of 10^4 K were captured by two UV SDO/AIA channels and also by the ground-based Swedish Solar Telescope (SST) which made a series of spectral and spectropolarimetric images of the cool off-limb loops in the spectral line of single ionized calcium Ca II 8542 Å and the hydrogen Balmer line Hβ at 4861 Å (Figure 2). The article by Kuridze et al. (2019) [12] reports on inferring the magnetic field strengths of the cool flare loops using the weak-field approximation applied to the Stokes I and V profiles of the Ca II 8542 Å line. The analysis reveals coronal magnetic field strengths as high as 350 G at heights up to 25 Mm above the solar limb. These measurements are substantially higher than a number of previous estimates and may have considerable implications for our current understanding of the extended solar atmosphere.

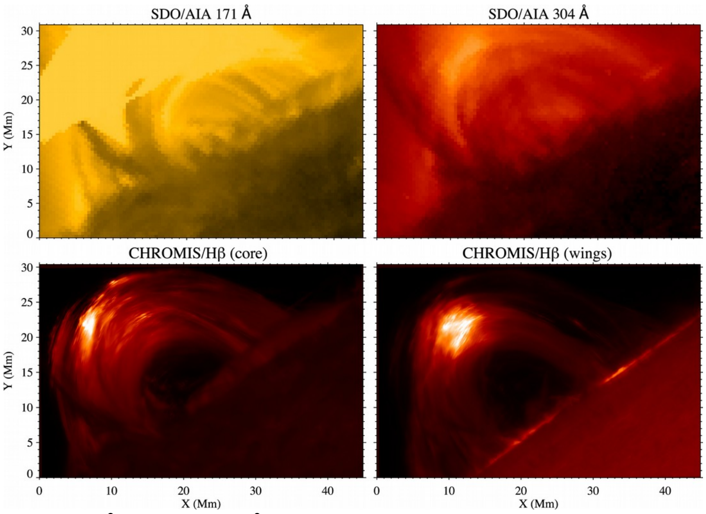


Figure 2. SDO/AIA 171 Å and 304 Å images (*top panels*) of the X8.2 class solar flare loops on 2017 September 10, 16:29 UT co-aligned with SST/CHROMIS Hβ line core (*bottom left panel*) and the composite of Hβ wing images at ± 0.735 Å (*bottom right panel*).

How much of the dust population originates locally in the solar system and how much comes from beyond? How big is the probability that an interstellar meteoroid passing through the solar system will hit the Earth? How are the speed measurements by which interstellar meteoroids are identified affected by the uncertainties of the statistical treatment or measurement errors? These problems and the presence of a large number of meteoroid orbits determined as hyperbolic in meteor databases has led to meteor astronomers who deal with particles registered in the Earth's atmosphere from AISAS and scientists who work with the dust measured on detectors on board of the space probes working together. The results, summarized in the chapter „Interstellar Meteoroids“, in a book published by Cambridge University Press in 2019 [1], showed that, except for two macroscopic interstellar objects, the only dependable detection of interstellar particles in our solar system to date are the measurements of interstellar dust originating from the Local Interstellar Cloud. Not a single case of a meteor claimed to be produced by an interstellar particle has proven satisfactorily convincing and not one interstellar fireball has yet been reported.

Researchers from AISAS carried out follow-up observations of targets from the K2 mission and discovered a unique object, a chemically peculiar Ap-type star showing δ Scuti pulsations that is bound in an eclipsing binary system with an orbital period shorter than 3 d [7]. HD 99458 is therefore a complex astrophysical laboratory opening doors for studying various, often contradictory, physical phenomena at the same time. It is the first Ap star ever discovered in an eclipsing binary. The orbital period of 2.722 d is the second shortest among all known chemically peculiar (CP2) binary stars. Pulsations of δ Scuti type are also extremely rare among CP2 stars and no unambiguously proven candidate has been reported. HD 99458 was formerly thought to be a star hosting an exoplanet, but we definitely reject this hypothesis using photometric observations from the K2 mission and new radial velocity measurements.

Besides of this, the AISAS staff was involved (or leading) in the last two years in 4 coordinated observing campaigns focused on observations of several aspects of the solar activity. The integral part of the campaigns were also measurements performed by the space-born instruments on different satellites, e.g. IRIS, SDO. The measurements were coordinated with the ground-based instruments including the AISAS owned CoMP-S and SCD instruments at the Lomnicky Peak Observatory.

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