The Sun is a source of the magnetic field and high energy particles which form the heliosphere spanning from the inner solar corona towards borders of the Solar System. Earth, and other planets, are plunged in it. Temporal changes of heliosphere state are typically measured within the Earth's magnetosphere, upper atmosphere, and cause effects on a ground. In recent years we unveiled the importance of gradual changes in the heliosphere state and its connection with 11 years solar activity cycle. We have better understanding of a strong influence of heliospheric phenomena on Earth's climate on time scales from abrupt, towards day-to-day and seasonal changes. Solar related phenomena propagating within and/or constituting a part of the heliosphere are known to impose substantial threat for space and ground technical infrastructure.

Short-term forecast of solar activity demands as good as possible understanding of basic mechanisms that converts a part of energy stored in stressed solar magnetic fields into other energy components. Such conversion takes place during active events in the corona. Observations of these active phenomena in the solar corona and their influence on the state of the heliosphere are main aims for ESA's key solar mission: *Solar Orbiter* (SolO) a part of the COSMIC VISION program. Observations conducted in the framework of this mission, which is equipped with 10 scientific instruments, will provide answers to the fundamental questions concerning solar physics, physics of the heliosphere and physics of the Solar System. For the first time observations of the Sun with high spatial resolution will be made from a distance as close as 0.3 AU. I*n-situ* measurements of magnetic field variability and energetic particles populations will allow to study their relation with active phenomena and their influence on the heliosphere. This will be undertaken with unprecedented quality and accuracy. During a SolO mission, for each of the many Venus's gravitational assist maneuvers, the orbiter will be transferred to the higher inclination orbit and higher ecliptic latitudes which will give better view of solar polar regions without geometrical distortions. Observing these regions is crucial for understanding of the solar dynamo mechanism and the small-scale active events occurring in polar regions which change their magnetic polarity every ~11 years.

One of the instruments installed onboard SolO is the Spectrometer Telescope for Imaging X-rays (STIX) which will observe the Sun in the 4-150 keV energy range. Images obtained by this instrument will achieve spatial resolution of 1000 km thanks to approaching the Sun as close as 0.3 AU. For hard X-ray imagers operating at Earth's orbit such resolution is impossible to reach. STIX is an imager equipped with a coded aperture. It means that instead of ordinary mirrors there are mounted pairs of grids with various pitch distances. Grids from each pair are slightly tilted relative to each other which causes occurrence of Moiré pattern on the front part of a detector. This pattern is precisely measured thanks to pixelated Calliste-SO detectors. STIX is equipped with 30 such grid pairs which allows to reconstruct images with desired excellent spatial resolution.

STIX is a sophisticated instrument which will operate in open interplanetary space. It will experience impacts of coronal mass ejections (CME) and solar energetic particles (SEP). Therefore, observational conditions will be highly variable which will demand precise planning of the observational modes. High energy particles cause undesirable effects in X-ray detectors, and they are a source of secondary radiation from orbiter constructional parts. In our project we plan to concentrate on investigating and modelling such effects, and plan to develop methods that will allow to subtract their influence from observational data. For this purpose we will use detector simulation system built in the Solar Physics Division SRC PAS, and software developed by STIX scientific software team. Interaction of high energy particles with parts of SolO will be analyzed with a Geant4 package developed at CERN. All tasks to be undertaken within this project will help to better understand processes in which energy is released from stressed solar magnetic fields.