

## Report on the STSM

### Proposal title:

Study of orbital and superorbital variability in LSI +61 303

**Description of purpose, results and plans:** LSI +61 303 is one of the very few binary systems emitting radiation from radio up to TeV energy range. The nature of the hidden object in this system is not known yet, and there are two main types of models used in literature - (1) in the so-called hidden pulsar model emission is due the interaction of the pulsar wind with the material ejected from the companion, and (2) alternatively in the microquasar model the observed emission is assumed to be due to the interaction of the relativistic jet from the compact object with the companion star outflow.

During my visit to Dublin Institute for Advanced Studies (Ireland) from 10 to 24 May, 2015 we analyzed all publicly available observational data collected with the Suzaku, SWIFT and XMM-Newton X-ray telescopes in order to systematically study the orbital and superorbital spectral variability of the system. For the first time we found variability in the column density. In addition we found that the previously reported hardening of the emission with the flux rise has a more complex nature than it was previously assumed. In addition we studied the variability of the emission temporal behaviour along the orbit.

Intensive discussion of the obtained results with Dr. Maria Chernyakova, who is leading expert in this field, allowed to critically test the existing theoretical models and to start the preparation of the draft of the paper to the MNRAS journal. We are expecting to finish this project and to submit our paper by the fall 2015.