

REPORT ON STSM

PROPOSAL TITLE:

Polarization of bright X-ray pulsars

Description of purpose, results and plans

The aim of the proposed project is to construct a theoretical reference frame for modeling X-ray polarization from bright X-ray pulsars, where the accretion luminosity is high enough to cause appearance of accretion column above neutron star (NS) surface (for more details see the proposal for STSM).

Thanks to collaborative work with Dr. Alexander Y. Potekhin, who is an expert in physics in a strong magnetic field, interesting results were achieved during my visit to the sector of Theoretical Astrophysics at the Ioffe Institute in Saint Petersburg (Russia) from 12 to 23 December 2016. We have discussed and constructed a numerical model of radiative transfer in NS atmospheres illuminated by accretion column. Compton scattering in strong magnetic field was taken to be the main process of interaction between radiation and matter. X-ray polarization was taken into account. At the moment we are testing our numerical model. We have realized that it would be necessary to take into account effects of vacuum polarization within extended region in NS magnetosphere. The effects will be included in the final numerical model.

Now we are working on this project separately in own home institutes. Main paper is planned to be prepared for publication in the first half of this year. A few sub-projects have arisen from the main project.