Contribution ID: **632** Type: **Talk in a parallel session**

Nonlinear vacuum electrodynamic lensing on magnetars

Friday, 12 July 2024 18:00 (20 minutes)

We study numerically a combined gravitational and nonlinear magnetic lensing effect on electromagnetic flux. A magnetar with a dipole magnetic field and background gravitational field is considered to deflect the light rays which passed through its magnetosphere. We assume a square wave front as a grid with the dynamic step. At the nodes of this grid, the rays enter perpendicularly into the cubic area, which covers the main magnetic lensing region with a magnetar at the center. On the basis of general relativity (GR) and nonlinear vacuum electrodynamics, the distribution of rays by the deflection angle in the combined field of the magnetar was obtained. On the basis of the analysis of the obtained data, it is possible to assert that the magnetic field distorts the result of gravitational lensing. Therefore, the magnetar is regarded as a gravitational-magnetic lensing object, wherein the magnetic field induces axial distortion within 10e-6. These results are expected to be detectable by modern instruments.

Co-authors: TALKHAT, A.; ABISHEV, Medeu (Al Farabi Kazakh National University); Mr YERNAZAROV, Tursynbek (al-Farabi Kazakh National University)

Presenter: ABISHEV, Medeu (Al Farabi Kazakh National University)

Session Classification: Galactic and extragalactic magnetars: recent observations and theoretical progress