

Silesian University in Opava, Institute of Physics
Faculty of Philosophy and Science

INTEREST IN SPACE PROJECTS AND RELATED RESEARCH

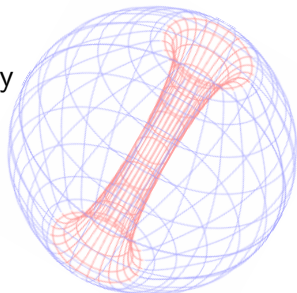
Prof. Zdeněk Stuchlík

ESA10yrs workshop and the Czech eXTP/LAD meeting.
12.11.2018 Prague

Projects and participation in projects

Participation in:

- Space missions: X-ray astronomy
 - ▶ ATHENA, eXTP (LOFT), XIPE, IXPE
in collaboration with ASU AVČR, ČVUT and others
- SKA in collaboration
with e-Research Centre Oxford University

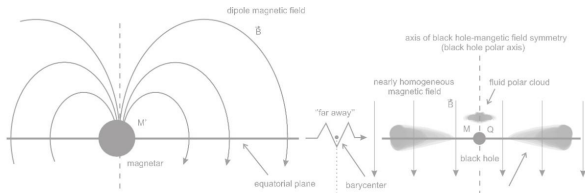


Projects and participation in projects

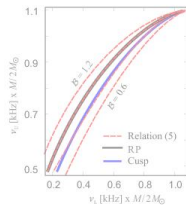
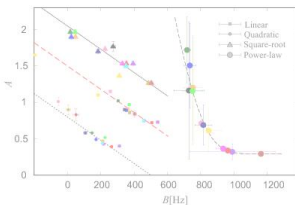
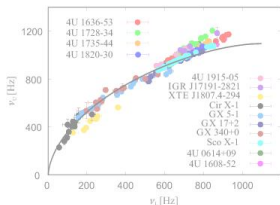
Projects:

- Excellence project GAČR 14-37086G
Albert Einstein Centre for Gravitation and Astrophysics
prof. Z. Stuchlík in SU, prof. J. Bičák in MFF UK (2014-2018).
- INTER-INFORM LTI17
Support of international scientific collaboration in relativistic astrophysics and development of X-ray space missions.
Doc. RNDr. Gabriel Török, Ph.D. (2017-2020) with AÚ AVČR
- INTER-INFORM, INTER-COST LTC18058
Neutron stars and pulsars
Mgr. Martin Urbanec, Ph.D. (2018-2021)

Research groups at Institute of Physics SU



- Research Centre of Theoretical Physics and Astrophysics
- Research Centre of Computational Physics and Data Processing



Research Centre of Theoretical Physics and Astrophysics

- Influence of large-scale magnetic fields on physical processes close to compact objects as black holes, neutron and quark stars, superspinars, naked singularities or regular strong gravity objects
- Manifestation of alternative theories of gravitation in physical processes close to compact objects
- Modelling of accretion structures within standard hydrodynamic models, and non-standard models of "dielectric" perfect fluid toroidal configurations or toroidal models based on kinetic theory
- Modelling of 1D string loop accretion structures reflecting tension of internal magnetic fields
- Influence of dark energy on astrophysical processes
- Models of observational effects generated by strong gravity field of compact objects

Research Centre of Computational Physics and Data Processing

- Study, modelling and visualisation of astrophysical processes in the vicinity of compact objects (black holes, neutron and strange stars), analysis of astrophysical data
- Modelling of the inner structure of compact objects and their equation of state
- Exploration of detailed influence of structure and induced spacetime of compact objects on their inner physical processes and processes in their vicinity
- Simulations of observed X-ray variability and spectra of accreting compact objects considering existing and future X-ray observatories
- Utilisation of advanced algorithms and hardware for parallel and accelerated computations and data processing