



INVITATION

to a Seminar talk on

May 23, 2024 (Thursday) --- 11:00 h

Seminar room 410 in building 401, KIT-CN

Speaker:

Yuri Y. Kovalev

MPIfR, Bonn

Title:

Multi-messenger Lighthouses of the Universe: The many extremes of Active Galactic Nuclei

Abstract:

Active galactic nuclei (AGN) make the most significant contribution to the overall energy balance in the Universe in all electromagnetic bands not dominated by the cosmic microwave background. A good understanding of physical processes and phenomena driving this contribution is paramount for addressing the key challenges in astrophysics and cosmology, including accretion onto black holes, electromagnetic fields, and shock waves in relativistic plasma. These factors can be best studied with comprehensive programs combining dedicated multi-band and multi-messenger measurements with ultra-high angular resolution imaging in the radio regime enabled by the technique of very long baseline interferometry (VLBI).

In this talk I will discuss results from several such studies which we have conducted recently, targeting different aspects of AGN physics. The discovery of extreme brightness in blazars, made with space VLBI observations, has set new limits on the very high rates of energy release in plasma. The mounting observational indications for extragalactic neutrino production in blazar-type AGN now begin to deliver key understanding about the physics of proton acceleration in blazars, either nearby central supermassive black holes or in plasma shocks embedded in the relativistic jets. Deriving from these results, the continued improvements of sensitivity and fidelity of VLBI observations, and the expected advent of a true era of multi-messenger astronomy, I will conclude by outlining several fundamental directions for studying the physical nature of AGN which will become feasible in the coming years.