



**FZU**

Institute of Physics  
of the Czech  
Academy of Sciences

## Invitation

to the seminar of Division of Elementary Particle Physics of the  
Institute of Physics of the Czech Academy of Sciences



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## Origin of Ultrahigh Energy Cosmic Rays in Binary Neutron Star Mergers

**Abstract:** I will briefly review the observations of ultra-high-energy cosmic rays (UHECRs), emphasizing which aspects are robust and which remain uncertain. A highly robust feature of the UHECR observations is explained for the first time, by the hypothesis that UHECRs are mainly or entirely produced in Binary Neutron Star (BNS) mergers. The well-defined initial conditions of a BNS merger yield a simple, no-free-parameter prediction of the cutoff energy for different nuclei, which agrees well with observations. Fits to the data under the BNS merger hypothesis suggest that the highest energy Auger events originated as r-process elements. A unique, testable prediction is that neutrinos above a PeV are preceded by a co-directional gravitational wave arriving about a day earlier.

**When:** Monday, June 15, 2026 at 10AM

**Where:** Dvořák hall, FZU, Pod Vodárenskou věží 1, Prague

For more information, please see <https://indico.fzu.cz/event/340/>