



SONDERKOLLOQUIUM

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BIBLIOTHEK, WESTBAU PHYSIK

Exploring intergalactic magnetic fields
as a window into new physics

DR. ANASTASIA SOKOLENKO

UNIVERSITY OF CHICAGO / FERMILAB

Particle physics is at a crossroads: new physics is there, but we do not know where to search for it. Astrophysics and cosmology offer numerous opportunities to narrow down the parameter space for new physics.

After briefly reviewing various ways to constrain the possible properties of new particles using astronomical data, I will focus on a potential relic that could provide invaluable information about processes in the early universe and, thus, about new physics. Strong hints from gamma-ray astronomy suggest the existence of a large-scale intergalactic magnetic field (IGMF) in the voids, occupying most of the volume of our universe. Intergalactic magnetic fields likely have a primordial origin and could become a new pillar of cosmology. To achieve this ambitious goal, the properties of the IGMF should be robustly measured and studied in detail. I will review dedicated efforts in gamma-ray and radio astronomy, as well as the progress in understanding galaxy formation and active galactic nuclei to differentiate the primordial component of the IGMF.