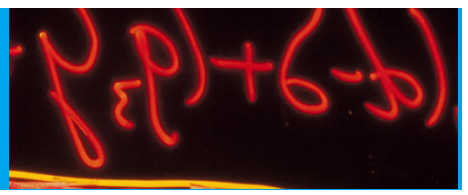
DESY
Particle and Astroparticle Physics Colloquium



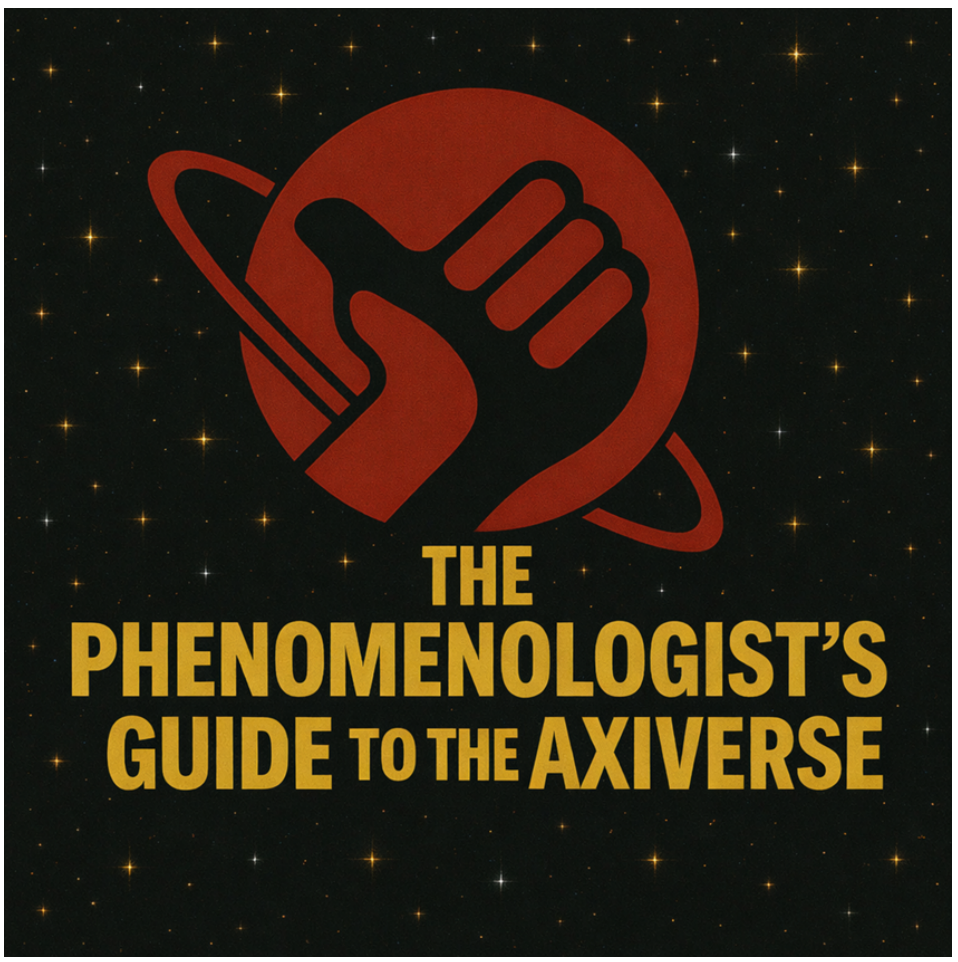
The Phenomenologist's Guide to the Axiverse.

Tuesday, 03 March, 2026
Auditorium & Webcast 16:00 h

ZOOM ID: 996 1652 8733
Meeting Password: 733220

Sokratis Trifinopoulos (CERN)

Axions offer a uniquely rich window into physics beyond the Standard Model, linking the solution of the strong CP problem to dark matter and to the broader "axiverse" predicted in many ultraviolet-complete theories. In this talk, I trace axions across the vast range of masses and scales they may inhabit: from the ultralight sub-eV regime and the largest cosmological distances, where their interactions with the visible sector are purely gravitational and large-scale structure (LSS) surveys provide the primary probes; through the keV–MeV range, where hadronic interactions become relevant and — intriguingly — discovery may occur at nuclear fusion facilities; to the smallest distances and heavier GeV-TeV axions explored at next-generation lepton-ion colliders.



Addressing this extraordinary span of scales demands an equally broad phenomenological toolkit, from effective field theories of LSS to AI-assisted modeling of atomic nuclei. In this context, I reflect on how the exploration of the axiverse reshapes the role of modern phenomenology at the interface of particle, nuclear, and cosmological physics.

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

DESY.

CLUSTER OF EXCELLENCE
QUANTUM UNIVERSE