



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

Εθνικόν και Καποδιστριακόν  
Πανεπιστήμιον Αθηνών

— ΙΔΡΥΘΕΝ ΤΟ 1837 —

Τμήμα Φυσικής  
Τομέας Φυσικής Συμπυκνωμένης Ύλης  
Πανεπιστημιούπολη, Ζωγράφου 15784

**ΣΕΜΙΝΑΡΙΟ  
ΦΥΣΙΚΗΣ ΣΥΜΠΥΚΝΩΜΕΝΗΣ ΥΛΗΣ**

**Τετάρτη 4 Νοεμβρίου 2020 -13:00**

<https://us02web.zoom.us/j/88077246522?pwd=NTRrRFFFc3RaVHhOWXRBO2pqTzUyZz09>

**«SQUID metamaterials: A testbed for nonlinear dynamics»**

**Δρ. Ιωάννα Χιτζανίδη**

The interplay between nonlinearity and structure is at the center of research on complex systems. In ensembles of coupled oscillators, the synergy between topological features and the underlying dynamics may lead to interesting self-organized phenomena. I will present a system that is capable of exhibiting such complex dynamics: a SQUID (superconducting quantum-interference device) metamaterial, i. e. an artificially structured medium of periodically arranged, weakly coupled SQUIDs, which shows extraordinary electromagnetic properties and tunability. From a dynamics point of view, the single SQUID is a highly nonlinear system exhibiting extreme multistability and chaos. I will talk about the emergent collective behavior in one-dimensional and two-dimensional SQUID arrays. The focus will be on spatiotemporal pattern formation and chimera states, a counter-intuitive symmetry breaking phenomenon of partial synchronization.

Short Bio

Dr. Johanne Hizanidis received her Ph.D. in 2008 from the Institute for Theoretical Physics at the Technische Universität Berlin (Germany), on control of noise-induced spatio-temporal dynamics in semiconductor superlattices. Since then, she has worked as a postdoctoral research associate at the Optical Communications Laboratory, Informatics and Telecommunications Department, University of Athens, and the Statistical Mechanics and Nonlinear Dynamics Laboratory of the INN institute at the National Center for Scientific Research “Demokritos”. She has also been a researcher at the Crete Center for Quantum Complexity and Nanotechnology of the Physics Department at the University of Crete. Since 2018 she is the Principal Investigator of the Research Project entitled “SQUID

metamaterials: Chimera states and spatio-temporal dynamics” (SQUIRREL) funded by the Hellenic Foundation for Research and Innovation. Her research expertise is on nonlinear dynamics in complex physical systems, and in particular on the mathematical modeling and simulation of collective behaviour.

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**Υπεύθυνος Οργάνωσης Σεμιναρίων:**

Κ. Τσακμακίδης

Πανεπιστήμιο Αθηνών,

τηλ. 2107276821

[ktsakmakidis@phys.uoa.gr](mailto:ktsakmakidis@phys.uoa.gr)