

# Seminar

Znanstvenog centra izvrsnosti  
QuantiXLie i Fizičkog odsjeka

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### Emergence of non-Abelian magnetic monopoles and Anyonic statistics in quantum impurity problems

By virtue of emergent gauge fields in quantum impurity problems, we demonstrate that in experimentally realized regime the anyon, a quantum rotor dressed by bosonic excitations, can be seen as a point charge on a two-sphere interacting with a gauge field of non-Abelian monopole. We find a topological transition associated with making the monopole Abelian, which takes place in the vicinity of the previously reported anyon instabilities. Furthermore, we show that identical impurities interacting with a two-dimensional many-particle environment obey anyonic statistics. In particular, we find that the bath manifests itself as an external magnetic flux tube with respect to the impurities, and hence the time-reversal symmetry is broken for the effective Hamiltonian describing the impurities. The emerging flux tube acts as a statistical gauge field after a certain critical coupling such that each of the impurities can be viewed as a flux-tube-charged-particle composite described by fractional statistics. The proposed setup paves the way to realizing anyons using electrons interacting with superfluid helium or lattice phonons, as well as using atomic impurities in ultracold gases.



Znanstveni centar izvrsnosti  
za kvantne i kompleksne sustave te  
reprezentacije Liejevih algebri

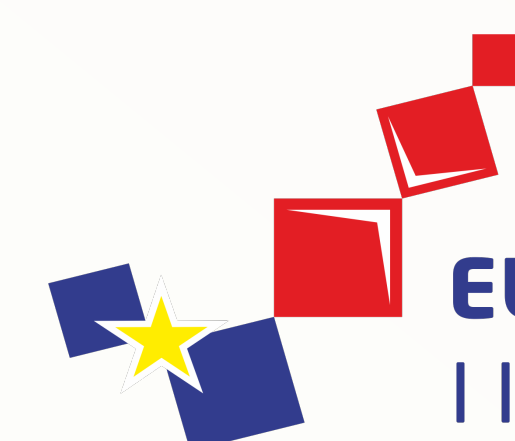
Projekt KK.01.1.1.01.0004

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Sadržaj ovog seminara isključiva je  
odgovornost Prirodoslovno-matematičkog  
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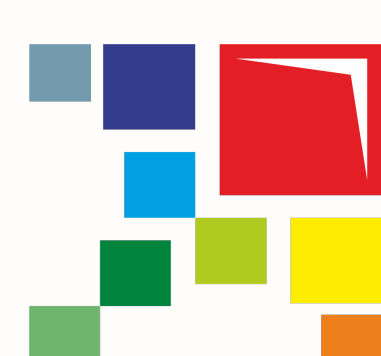
**Četvrtak, 13. 12. 2018., 15h**  
**Fizički odsjek, Plava soba (1. kat)**



Europska unija  
Zajedno do fondova EU



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