



Universidad  
del País Vasco

Euskal Herriko  
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**EHU QC**

EHU Quantum Center

## Theoretical Physics Seminar Series

# Scalar charges and black hole hair

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**Abstract:** Black holes can have no hair. Scalar charges, which do not seem to obey any conservation law and have no consistent definition, are considered hair. Nevertheless, many black holes seem to have this kind of hair because there are very special values of the scalar charge which seem to be allowed by the no-hair conjecture because they are considered "secondary hair." It has been argued that these scalar charges play a role in the first law of black-hole mechanics, in spite of their lacking a consistent definition.

In this talk I will propose a consistent definition of scalar charge in stationary black-hole spacetimes which I will use to determine its possible allowed value and formulate no-hair theorems. In order to describe this definition, I will review the definition of conserved charges associated to local and global symmetries in a pedagogical way.

**Prof. A. Chamorro Seminar Room, Theoretical Physics Seminar Room**

**Wednesday, Oct. 18th, 2023**

**Time: 11:40 am**