

# SEMINARIO DEL DEPARTAMENTO DE FÍSICA TEÓRICA

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## The Higgs and its Possible Impostors: Discovery and Discrimination at the LHC

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**Abstract:** The properties of the elusive scalar of the standard model, given its mass, are entirely specified. In spite of this, there are good reasons to re-discuss some obvious questions:

- To what extent does a given set of observations compatible with the predictions constitute an indisputable discovery?
- What process and analysis procedure can reach "discovery level" first?
- With what confidence can one determine the quantum numbers of a putative scalar, and study whether it is elementary or composite, and pure or "impure" in its couplings?
- How and how well can one favour or exclude "Higgs impostors"?

Our emphasis is on the "most wanted" standard particle and its  $ZZ$  or  $ZZ^*$  decays. Yet, our analysis tools inevitably encompass the study and characterization of novel neutral bosons of spin 1 and 2. They are extensible to other particles and decays.