



CENTRO DE  
**MATEMÁTICA**  
UNIVERSIDADE DO PORTO

GEOMETRY AND TOPOLOGY SEMINAR

# Riemannian submersions, gauge theories and Kaluza-Klein models

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**Abstract.** In this talk, I will describe how Riemannian submersions on a spacetime of the form  $M_4 \times K$  relate to  $\text{Diff}(K)$ -gauge theories on the base manifold  $M_4$ . This framework generalizes the usual Kaluza–Klein ansatz by allowing the fibres of the submersion to have variable geometry and not be totally geodesic. In this case, the higher-dimensional metric encodes both massless and massive 4D gauge fields, as well as a non-trivial Higgs sector. I will discuss new features of these geometrical models and their implications for 4D physics. For example, how geodesics in higher-dimensions correctly indicate that the classical mass and charge of a test particle, as perceived in 4D, can change in regions of spacetime where massive gauge fields are present.

FRIDAY, OCTOBER 3

15H30

ROOM FC1-1.09



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There will be coffee after the talk.