

Tuesday, February 26<sup>th</sup>, 12:00

Seminar room at the Mathematics Department of the UPV/EHU

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## DENSITY OF SMOOTH MAPS IN MANIFOLD-VALUED SOBOLEV SPACES

Sobolev spaces of manifold-valued maps arise naturally in the study of some variational problems coming from materials science. Indeed, the behavior of some materials (such as nematic liquid crystals) can be described by a map  $u$  from a Euclidean domain  $\Omega$  to a compact, smooth Riemannian manifold  $N$ , which parametrises the possible local configurations for the material. The map  $u$  is required to belong to a suitable energy space --- for instance, the gradient of  $u$  must be  $p$ -th power integrable. We are then led to define the Sobolev space  $W^{1,p}(\Omega, N)$ .

We will focus on a functional-analytical question: are smooth maps dense in  $W^{1,p}(\Omega, N)$ ? The answer turns out to depend on topological obstructions. In this talk, which is designed as an introduction to the topic, we will review a few classical density and non-density results.