

## **$G_2$ -instantons on nilpotent Lie groups**

Viviana del Barco

In this talk we will discuss recent advancements on  $G_2$ -instantons on 7-dimensional 2-step nilpotent Lie groups endowed with a left-invariant coclosed  $G_2$ -structures. I will present necessary and sufficient conditions for the characteristic connection of the  $G_2$ -structure to be an instanton, in terms of the torsion of the  $G_2$ -structure, the torsion of the connection and the Lie group structure. These conditions allow to show that the metrics corresponding to the  $G_2$ -instantons define a naturally reductive structure on the simply connected 2-step nilpotent Lie group with left-invariant Riemannian metric. This is a joint work with Andrew Clarke and Andrés Moreno.