Università degli Studi della Basilicata
Dipartimento di Matematica, Informatica ed Economia

Seminario Interdisciplinare di Matematica

Si avvisano gli interessati che ***Giovedì 28 Settembre 2017***, **alle ore 16:30**, nell'Aula Seminari del Dipartimento (Aula n. 18),

Eric LOUBEAU
(Université de Bretagne Occidentale)

terrà la conferenza dal titolo

Harmonicity of G_2-structures

Summary. In this talk I will present an approach of G_2-structures on seven-dimensional Riemannian manifolds, based on the theory of harmonic maps.
Harmonic maps are defined as critical points of the energy functional

$$E(\phi) = \frac{1}{2} \int_M |d\phi|^2 \, v_g,$$

and characterized by the vanishing of the associated Euler-Lagrange operator, the tension field, which is a system of semi-linear partial differential equations of second order.
I will review some of the essential results on harmonic maps and then turn to the specific case of vector fields, viewed as maps from M to TM (equipped with the Sasaki metric) which must satisfy

$$\nabla^* \nabla \sigma = 0$$

when harmonic.
This will unfortunately lead to a blind alley but it will serve as toy-model for the more interesting but more challenging case of sections of homogeneous bundles with a particular geometrical meaning.
After a quick overlook of the unified set-up of geometrical structures, I will illustrate this with the historical example of almost complex structures and then the lesser-known case of almost contact structures.
Recently, in dimension seven, efforts have been made to apply these ideas to G_2-structures, as preparatory conditions to obtaining G_2-manifolds. These have led to a harmonic condition for G_2-structures, through their characteristic three-forms, which paves the way for the formulation of a heat flow type of problem.