Gravitational Geometry and Dynamics (GGD) Group Seminar

The Beauty of Self-Duality

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Topological solitons play an important role in many areas of Physics. In some cases they constitute the normal modes of field theories in the strong coupling regime. There is a class of topological solitons that are special. They are solutions of first order differential equations (self-dual eqs.) that also solve the second order Euler-Lagrange equations. In addition, they saturate a lower bound on the energy, and so they are very stable. The magic behind those special properties is the existence of a topological charge (homotopy invariant) that admits an integral representation, and so a topological charge density. As the topological charge is invariant under arbitrary (homotopic) smooth variations of the fields, its integral representation leads to identities, in the form of partial differential equations, that allows one integration less to construct the solutions. Recently it has been observed that the integral representation of the topological charge admits the introduction of extra degrees of freedom in the theory, and leads to a generalized self-duality that presents a wider space of solutions. We discuss examples ranging from Euclidean Yang-Mills and static Yang-Mills-Higgs to scalar theories in $1 + 1$ dimensions.

Wednesday, April 20th 2022, 14H30 || Zoom online
Zoom Meeting ID: 852 8915 0495 || https://videoconf-colibri.zoom.us/j/85289150495
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More information about the GGD group and seminars in gravitation.web.ua.pt