IFWGP´07 | International Fall Workshop on Geometry and Physics

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Title: Twistorial constructions of special Riemannian manifolds

Abstract:
We recall twistor space theory in order to describe virtualy new constructions of complex structures on bundles, quaternionic-K‰hler structures on tangent bundles and a G_2 structure on the tangent unit sphere bundle of a Riemannian 4-manifold. These are fundamental concepts of Riemannian holonomy, which may still be subject of deep research and indeed are permanently observed by physicists.

We also use twistor theory to interpret "self-holomorphic" complex structures on a symplectic manifold. These are seen to satisfy a certain condition, with consequences in the induced metric.

In particular, those complex structures give an interesting set of problems in the first possible dimension, the case of Riemann surfaces, from which should follow some interplay with Teichmuller theory, as well as some results for SL(2) connections.