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A Theory of Multiholomorphic Maps

In recent decades the phenomena associated to pseudoholomorphic curves in Kähler manifolds have led to the discovery of a number of interesting invariants of symplectic manifolds –including notably Floer theories of various kinds and quantum cohomology. I will introduce the generalizing framework of multiholomorphic mappings of which the theory of pseudoholomorphic curves forms one of a few families of examples. This is a theory pertaining to mappings (between Riemannian manifolds) which satisfy a particular PDE describing the intertwining of geometric data on domain and target. In particular I will focus the talk on a family of examples of multiholomorphic maps which involves maps from a 3-manifold into a G_2-manifold. There are close relations to calibrated geometry and mathematical physics.