



# LEZIONE LAGRANGIANA

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Geometric partial differential equations from unified string theories

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ABSTRACT: The laws of nature at its fundamental level have long been a source of inspiration for geometry and partial differential equations. With unified string theories and particularly supersymmetry, a particularly important new requirement has emerged, which is that of special holonomy. The earliest manifestation was identified by Candelas, Horowitz, Strominger, and Witten in 1985 as the Calabi-Yau condition, but more general spaces have emerged since, that can be interpreted as generalizations of the Calabi-Yau condition to both non-Kähler complex geometry and symplectic geometry. The corresponding equations are interesting in their own right from the point of view of the theory of non-linear partial differential equations. We shall survey some of these developments, with emphasis on the analytic open problems.

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