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Calibrated submanifolds in geometry and physics

Abstract: In their quest for special geometric structures defined by submanifolds, Harvey and Lawson introduced the class of *calibrated submanifolds*, which have the property to be locally volume minimising in their homology class. This notion is particularly interesting if the ambient manifold M^n comes along with a linear G -structure, i.e. $G \subset GL(n)$. On the other hand, linear G -structures naturally show up in compactifications of heterotic string theory. In this situation, calibrated submanifolds correspond to the so-called *D-branes*.

The first half of the lecture is devoted to explain this link in detail. In the second half, we discuss an analogous concept for *generalised G -structures*, i.e. $G \subset SO(n, n)$, which models D-branes in type II string theory.