

# The Calabi-Yau equation on almost-Kähler four-manifolds

BEN WEINKOVE

*Harvard University*

Let  $(M, \omega)$  be a compact symplectic 4-manifold with a compatible almost complex structure  $J$ . The problem of finding a  $J$ -compatible symplectic form with prescribed volume form is an almost-Kähler analogue of Yau's theorem and is connected to a programme in symplectic topology proposed by Donaldson. We call the corresponding equation for the symplectic form the 'Calabi-Yau equation'. It will be shown that a solution to this equation exists if the Nijenhuis tensor is small in the  $L^p$  norm for  $p > 2$ . Without this assumption, it is shown that the problem of existence can be reduced to obtaining a  $C^0$  bound on a scalar potential function.