

Kähler–Ricci flow, Morse theory, and vacuum structure deformation of $N = 1$ supersymmetry in four dimensions

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Abstract

We address some aspects of four-dimensional chiral $N = 1$ supersymmetric theories on which the scalar manifold is described by Kähler geometry and can further be viewed as Kähler–Ricci soliton generating a one-parameter family of Kähler geometries. All couplings and solutions, namely the BPS domain walls and their supersymmetric Lorentz invariant vacua turn out to be evolved with respect to the flow parameter related to the soliton. Two models are discussed, namely $N = 1$ theory on Kähler–Einstein manifold and $U(n)$ symmetric Kähler–Ricci soliton with positive definite metric. In the first case, we find that the evolution of the soliton causes topological change and correspondingly, modifies the