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Strongly Hermitian Einstein-Maxwell solutions on ruled surfaces

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If we take a Kähler metric g in a compact complex manifold (M, J), we know from the famous work of Yamabe, Trudinger, Aubin, and Schoen that there always exists some positive smooth function $f : M \to \mathbb{R}^+$ such that the metric $h = f^{-2}g$ has constant scalar curvature. It turns out, as was discovered by LeBrun and Apostolov, Calderbank, and Gauduchon, that if such a function f satisfies that $J\, grad\, f$ is a killing field, then h is part of a solution (h, F) to the Riemannian version of the so-called Einstein-Maxwell equations, where F is a certain real 2-form on M. Further, F (as well as h) is invariant under the tensor J. Fittingly, such Einstein-Maxwell solutions are called Strongly Hermitian Einstein-Maxwell solutions.

This talk, which is based on joint work with Caner Koca, discusses the existence of Strongly Hermitian Einstein-Maxwell solutions on (geometric) ruled surfaces of arbitrary genus. The work was inspired by Claude LeBrun's work on Hirzebruch surfaces. Indeed, Claude gave us the inspiration and encouragement to embark on this project.

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