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Caner Koca* (caner.koca@vanderbilt.edu), Vanderbilt University, Department of Mathematics, 1326 Stevenson Center, Nashville, TN 37240. *Bach-Maxwell Equations and Extremal Kähler Metrics.*

On a compact oriented 4-manifold one can introduce an interesting coupled system of PDEs, called the Bach-Maxwell equations, for the Riemannian metrics and harmonic 2-forms. These equations can be thought as the conformal versions of the classical Einstein-Maxwell Equations in physics, and therefore the solutions are geometrically significant. In this talk, I will show that extremal Kähler metrics on compact complex surfaces are solutions of these equations for a suitable 2-form. In particular, Kähler-Einstein metrics or more generally, Kähler metrics of constant scalar curvature are among the solutions. I will also discuss various variational characterizations of the solutions of Bach-Maxwell Equation, and possible applications in study of extremal Kähler metrics. (Received September 14, 2013)