1139-53-569   **Yu Zeng*** (`yzeng15@ur.rochester.edu`), Dept. of Mathematics, University of Rochester, Rochester, NY 14627. *The regularity of the minimizer of the K-energy.*

In this talk, we study constant scalar curvature equation (CSCK), a nonlinear fourth order elliptic equation, and its weak solutions on Kähler manifolds. We first define a notion of weak solution of CSCK for an L^∞ Kähler metric. The main result is to show that such a weak solution (with uniform L^∞ bound) is smooth. As an application, this answers in part a conjecture of Chen regarding the regularity of K-energy minimizers. The new technical ingredient is a $W^{2,2}$ regularity result for the Laplacian equation $\Delta_g u = f$ on Kähler manifolds, where the metric has only L^∞ coefficients. It is well-known that such a $W^{2,2}$ regularity ($W^{2,p}$ regularity for any $p > 1$) fails in general (except for dimension two) for uniform elliptic equations of the form $a^{ij}\partial^2_{ij}u = f$ for $a^{ij} \in L^\infty$, without certain smallness assumptions on the local oscillation of a^{ij}. We observe that the Kähler condition plays an essential role to obtain a $W^{2,2}$ regularity for elliptic equations with only L^∞ elliptic coefficients on compact manifolds. (Received February 19, 2018)