

**Meeting:** 1007, Santa Barbara, California, SS 8A, Special Session on Geometry and Physics

1007-53-83            **Zhuang-dan Daniel Guan\*** (zguan@math.ucr.edu), Department of Mathematics, University of California at Riverside, Riverside, CA 92521. *New Kähler-Einstein metrics on almost homogeneous manifolds, Calabi flows and extremal solitons.* Preliminary report.

In this talk I will talk about 3 recent breakthroughs on the Kähler-Einstein type metrics of compact almost homogeneous manifolds of cohomogeneity one. First, we proved that there is an extremal metric in a Kähler class if and only if the given Kähler class is geodesic stable. The last step of the proof followed by the dealing with an exceptional manifold of complex seven dimension and under a  $G_2$  action. The new method also deals with the affine cases. In particular, the smooth geodesics in the infinite dimensional Mabuchi moduli is founded. Second, we proved that the modified Calabi flow converges to the extremal metrics on compact almost homogeneous manifolds with two hypersurface ends. Third, we defined extremal-soliton metrics which including both extremal metrics and quasi-einstein metrics (which I studied in 1992, appeared in 1995 International Journal of Math., also called Kähler-solitons, e.g., Ricci solitons). We proved that there is a one parameter family of extremal-solitons in each Kähler class which connecting the extremal metrics and the quasi-einstein metrics. We also proved that the existence of extremal-soliton metrics in a Kähler class with a similar  $CP^1$  bundle construction is the same as the geodesic stability. (Received February 03, 2005)