Meeting: 1005, Newark, Delaware, SS 12A, Special Session on Geometric Analysis

1005-53-42 **Ben Weinkove*** (weinkove@math.harvard.edu), Mathematics Department, Harvard University, 1 Oxford Street, Cambridge, MA 02138, and **Jian Song**. *On the convergence and singularities of the J-flow with applications to the Mabuchi energy.*

The J-flow of S. K. Donaldson and X. X. Chen is a parabolic flow on Kahler manifolds with two Kahler metrics. It is the gradient flow of the J-functional which appears in Chen's formula for the Mabuchi energy. We find a positivity condition in terms of the two metrics which is both necessary and sufficient for the convergence of the J-flow to a critical metric. We use this result to show that on manifolds with ample canonical bundle, the Mabuchi energy is proper on all Kahler classes in an open neighborhood of the canonical class defined by a positivity condition. The implications of this for the problem of the existence of constant scalar curvature Kahler metrics will be discussed.

When the J-flow develops singularities, we show that, in some cases, estimates can be derived away from a subvariety. These can be used to prove, in two dimensions, a weak form of a conjectural remark of Donaldson that if the J-flow does not converge then it should blow up over some curves of negative self-intersection. (Received January 19, 2005)