1072-58-110 **Sushmita Venugopalan*** (sushvenu@math.rutgers.edu) and **Chris Woodward**.
Yang-Mills-type heat equation on gauged holomorpic maps. Preliminary report.

Let G be a compact Lie group and, $P \to \Sigma$ be a principal G-bundle on the Riemann surface Σ. Let X be a compact Kahler Hamiltonian-G-manifold with moment map Φ. A gauged holomorphic map is a pair (A, u) where A is a connection on P and u is a holomorphic section of the fiber-bundle $(P \times X)/G$. On the space of these holomorphic maps, the action of the gauge group has moment map $(A, u) \mapsto *F_A + u^*\Phi$.

In this work with Chris Woodward, we study the gradient flow lines of the functional $(A, u) \mapsto \| * F_A + u^*\Phi\|^2_{L^2}$. For compact Σ, possibly with boundary, we prove long time existence of flow. The flow lines converge to critical points of the functional.

This gradient flow preserves complex gauge orbits. And, the zero level set of the functional are symplectic vortices. So, an application of this is to prove a version of Mundet's Hitchin-Kobayashi corresponce on $\mathbb{C}$ - if (A, u) is a gauged holomorphic map on $\mathbb{C}$ with $\|*F_A+u^*\Phi\|_{L^2} < \infty$, satisfying some stability conditions, then the closure of its complex gauge orbit contains a symplectic vortex. This could lead to a generalization of the classification result of Jaffe-Taubes. (Received June 23, 2011)