1063-35-139 **Lincoln Chayes**, **Wilfrid Gangbo** and **Helen K Lei*** (glei@math.ucla.edu). *Inhomogeneous Continuity Equation with Application to Hamiltonian ODE.*

We consider a Hamiltonian $\mathcal{H}$ on $\mathcal{M}_2(\mathbb{R}^d)$, the set of (positive) Borel measures with bounded second moment on the phase space $\mathbb{R}^{2d}$: We study the initial value problem $\frac{d\mu_t}{dt}\nabla cdot(J_d v_t \mu_t) = 0$, where J_d is the canonical symplectic matrix, μ_0 is the prescribed initial measure, and v_t is a (time-dependent) velocity field growing polynomially at infinity. In contrast to the mass-conserved case, here we are particularly interested in dynamics where particles may reach infinity in finite time, thus leading to deficient meaures. We equip $\mathcal{M}_2$ with a suitable distance derived from the Wasserstein distance and first consider a regularized problem corresponding to the continuity equation with a nonzero right hand side. We construct solutions to the regularized problem and show that in a well-defined sense, as the regularization parameter tends to zero, the Hamiltonian is preserved. This is joint work with L. Chayes and W. Gangbo. (Received August 13, 2010)