1151-35-207 **Cecilia F Mondaini*** (cfmondaini@gmail.com), Philadelphia, PA , and **Nathan Glatt-Holtz**.
Numerical approximation for invariant measures of the 2D Navier-Stokes equations.

We consider the problem of approximating statistically steady states of the 2D stochastic Navier-Stokes equations (SNSE) via an approximating sequence of measures generated from a space-time discretization of the 2D SNSE. More specifically, we consider a spectral Galerkin spatial discretization and a semi-implicit Euler time scheme. We show that successive iterations of the Markov semigroup associated to the discretized system, starting from any initial probability distribution, converge to the invariant measure of the continuous system. The proof is obtained with two main steps: a spectral gap result for the discretized system which is independent of the discretization parameters, and finite time L^2-convergence of the discretized system towards the continuous one. Most importantly, this approach allows us to obtain explicit rates of convergence with respect to the number of iterations in the Markov chain, up to (also explicit) numerical discretization error. This is a joint work with Nathan Glatt-Holtz. (Received August 19, 2019)