1037-92-74 **Junping Shi**, Department of Mathematics, College of William and Mary, Williamsburg, VA , and **Zhifu Xie*** (zxie@vsu.edu), Department of Mathematics & Computer Science, Virginia State University, Petersburg, VA. *Cross-diffusion induced instability and stability in reaction-diffusion systems.*

In a reaction-diffusion system, diffusion can induce the instability of a uniform equilibrium which is stable with respect to a constant perturbation, as shown by Turing in 1950s. We show that cross-diffusion can destabilize a uniform equilibrium which is stable for the kinetic and self-diffusion reaction systems; on the other hand, cross-diffusion can also stabilize a uniform equilibrium which is stable for the kinetic system but unstable for the self-diffusion reaction system. Application is given to vegetation pattern formation in a water-limited ecosystem. (Received January 23, 2008)