

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Jiaglun Wu**

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报告题目:

**On weak solutions of stochastic differential equations with sharp irregular drifts**

邀请人: 洪佳林 研究员

报告时间: **2018年8月9日 (周四)**

**下午 16:00-17:00**

报告地点: **数学院南楼二层**

**222 教室**

## Abstract:

In this talk we will discuss the following Brownian motion driven SDE 
$$X_t = x + \int_0^t b(s, X_s) ds + W_t, \quad t \in [0, T],$$
  $x \in \mathbb{R}^d$  with an irregular drift  $b: [0, T] \times \mathbb{R}^d \rightarrow \mathbb{R}^d$ . We are aiming to extend Krylov and Rockner [Strong solutions to stochastic equations with singular time dependent drift. *Probab. Theory Relat. Fields* **131** (2005) 154-196] to the case with a sharp critical  $b$ . To be more precise, if  $b := b_1 + b_2$  such that  $b_1(T \cdot) \in \mathcal{C}_q^0((0, T); L^p(\mathbb{R}^d))$  with the critical condition  $2/q + d/p = 1$  for  $p, q \geq 1$  and  $\|b_1(T \cdot)\|_{\mathcal{C}_q((0, T); L^p(\mathbb{R}^d))}$  is sufficiently small, and that  $b_2$  is bounded and Borel measurable, then there exists a unique weak solution to the above equation. Moreover, we derive the strong Feller property of the semi-group and existence of density associated with the above SDE. As an application, we extend classical regularity results for parabolic PDEs with  $L^q(0, T; L^p(\mathbb{R}^d))$  coefficients to equations with  $L^\infty_q(0, T; L^p(\mathbb{R}^d))$  coefficients, and further derive the Lipschitz regularity. (Joint work [arXiv:1711.05058] with Jinlong Wei [Zhongnan University of Economics and Law, Wuhan, China] and Guangying Lv [Henan University, Kaifeng, China].)

欢迎大家参加!