

Im

Oberseminar Partielle Differentialgleichungen

gibt es am

**Donnerstag, dem 28. Juni 2018,**

einen Vortrag von Herrn

**Prof. Abdelaziz Rhandi, PhD**

(University of Salerno, Italy)

*“ Elliptic operators with unbounded coefficients:  
Generation and kernel estimates ”*

Beginn: **15.15 Uhr**

Raum: **F 426**

Interessenten sind herzlich willkommen!

R. Racke, O. Schnürer

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**Abstract:** In this talk we give an overview on recent results concerning elliptic operators with unbounded coefficients. In this talk we give an overview on recent results concerning elliptic operators with unbounded coefficients.

In particular, we prove that the realization  $A_p$  in  $L^p(\mathbb{R}^N)$ ,  $1 < p < \infty$ , of the elliptic operator  $A = (1 + |x|^\alpha)\Delta + b|x|^{\alpha-1}\frac{x}{|x|}\nabla - |x|^\beta$  with domain  $D(A_p) = \{u \in W^{2,p}(\mathbb{R}^N) | Au \in L^p(\mathbb{R}^N)\}$  generates a strongly continuous analytic semigroup  $T(\cdot)$  provided that  $\alpha > 2$ ,  $\beta > \alpha - 2$  and any constant  $b \in \mathbb{R}$ . Moreover, we show that  $T(\cdot)$  is consistent, immediately compact and ultracontractive.

We end the talk by proving that the heat kernel  $k$  associated to the operator  $A$  satisfies

$$k(t, x, y) \leq c_1 e^{\lambda_0 t + c_2 t^{-\gamma}} \left( \frac{1 + |y|^\alpha}{1 + |x|^\alpha} \right)^{\frac{b}{2\alpha}} \frac{(|x||y|)^{-\frac{N-1}{2} - \frac{1}{4}(\beta-\alpha)}}{1 + |y|^\alpha} \\ \times \exp \left( -\frac{\sqrt{2}}{\beta - \alpha + 2} \left( |x|^{\frac{\beta-\alpha+2}{2}} + |y|^{\frac{\beta-\alpha+2}{2}} \right) \right)$$

for  $t > 0$ ,  $|x|, |y| \geq 1$ , where  $b \in \mathbb{R}$ ,  $c_1, c_2$  are positive constants,  $\lambda_0$  is the largest eigenvalue of the operator  $A$  and  $\gamma = \frac{\beta-\alpha+2}{\beta+\alpha-2}$ .

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(invited by PD Dr. Markus Kunze)