

**Title: A heat equation with exponential nonlinearity and with singular data in  $R^2$**

*Abstract:*

We consider a semilinear heat equation with exponential nonlinearities and singular data in  $R^2$ .

In  $R^n$ ,  $n \geq 3$ , critical growth related to singular initial data is polynomial and has been studied by several authors:

Existence and non-existence results for singular initial data in suitable  $L^p$ -spaces were obtained by F. Weissler and H. Brezis - T. Cazenave; furthermore, non-uniqueness results for certain singular initial data were given by W.-M. Ni - P. Sacks and E. Terraneo.

In  $n = 2$  critical growth is given by nonlinearities of exponential type (cf. N. Trudinger - J. Moser). We prove that similar phenomena, namely existence, non-existence and non-uniqueness, occur for suitable exponential nonlinearities and singular initial data in certain Orlicz spaces.

This is joint work with N. Ioku (Ehime University) and E. Terraneo (University of Milan).