

Séminaire EDP de l'ERC ReaDi  
Equations de réaction-diffusion, propagation et modélisation  
Henri Berestycki

Les membres de l'ERC ReaDi sont heureux d'annoncer le lancement d'un cycle de séminaires autour des Equations aux Dérivées Partielles qui se tiendront un mercredi sur deux à l'École des Hautes Etudes en Sciences Sociales à commencer du mercredi 11 Février. Retrouvez toutes les informations sur le séminaire : <http://readi-project.weebly.com/pde-seminar.html>.

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Prochaine séance : **mercredi 18 février à 10h**  
Salle 466, EHESS, 190-198 avenue de France, 75013 - Paris

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**Nicola Soave**, *Justus-Liebig-Universität, Gießen*

Title: **Liouville-type theorems for an elliptic system modelling phase-separation and optimal partition problems**

Abstract: In this talk we consider solutions of the competitive elliptic system

$$\begin{cases} -\Delta u_i = -\sum_{j \neq i} u_i u_j^2 & \text{in } \mathbb{R}^N \\ u_i > 0 & \text{in } \mathbb{R}^N \end{cases} \quad i = 1, \dots, k, \quad (1)$$

which appears in the analysis of phase separation phenomena for Bose-Einstein condensates with multiple states. We are concerned with the classification of entire solutions, according with their (algebraic) growth rate. The prototype of our main results is the following: for every  $d > 0$  there exists  $h = h(d, N) \in \mathbb{N}$  such that if  $(u_1, \dots, u_k)$  is a solution of (1) and

$$u_1(x) + \dots + u_k(x) \leq C(1 + |x|^d) \quad \text{for every } x \in \mathbb{R}^N,$$

then  $k \leq h(d, N)$ . This means that a bound on the growth of a positive solution imposes a bound on the number of components  $k$  of the solution itself. The value  $h(d, N)$  is explicitly characterized in terms of an optimal partition problem. We discuss the sharpness of our results and, as a further step, for every  $N \geq 2$  we can prove the 1-dimensional symmetry of the solutions of (1) satisfying suitable assumptions, extending known results which are available for  $k = 2$ . The proofs rest upon a blow-down analysis and on some monotonicity formulae. This is a joint work with Susanna Terracini.

Organisateurs : Jian Fang, Grégory Faye, Andrea Tellini et Alessandro Zilio



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