

# Report on the project ESF/EPST - 3426

## Workshop Stochastic Dynamics in Mathematics, Physics and Engineering

2-4 November 2011- Bielefeld, (Germany)

Organizers :

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### **Participation and organization issues**

The workshop has been attended by 23 participants, coming from European countries (3 exceptions : one from South Africa, one from USA and one from Japan) and one can also mention a few local doctoral students from the University of Bielefeld who attend informally to the event. Among these participants, 18 did deliver contributions of 45 minutes each. An almost perfect balance between the three themes Mathematics, Physics and Engineering was respected. As most of the talks were didactical and the schedule was not overloaded, plenty occasions for discussions were offered and indeed participants did interact. The lunch were taken in the Zentrum für Interdisziplinäre Forschung, (ZiF) and this enable to continue discussions at the table. Let me also mention that among the participants, we enjoy to count several PhD students mostly from Bielefeld. All speakers had accommodation in the same hotel and in the morning transportation were organized by the ZiF to bring the participants to the workshop. One evening (thursday the 3rd November), we had a simple but truly convivial dinner in the old city of Bielefeld. Summarizing, the the organization and the logistics were absolutely perfect and I really can point out the efficiency and professionalism. of the ZiF staff.

## Scientific issues

Basics themes in direct relation with Exploring the Physics of Small Devices (EPSD) were discussed with a strong accent towards stochastic issues. Fluctuations ubiquitously affect the dynamics of small devices and this was reflected in the contributions which, in their vast majority, paid attention to stochastic dynamics. Without being exhaustive, let us briefly highlight some basic aspects that have been discussed during the workshop. The conference did open with a beautiful and truly didactical mathematic contribution delivered by Prof. Niels Berglund, (Orléans-F) who shows how noise may create or suppress oscillations. A somehow similar problematic with more physical aspect, has also been proposed by Prof. Natalia Janson (Loughborough-UK), here again the exposition was beautifully didactical. A dynamic system point view involving pure mathematic approach has been proposed by Prof. Fritz Colonius (Augsburg-D). Engineering issues have been exposed by Prof Dieter Armbruster, (Tempe, Arizona - USA) who discuss the stability of production flows in re-entrant queuing networks. As far as applications are concerned, bio-engineering was well represented by Prof. Felix Naef, (EPF-Lausanne-CH), Prof. Bruno Cessac (Sophia-Antipolis-F) and Prof. Benjamin Lindner, (Berlin-D). Interactions between several stochastic agents has been discussed by Prof. Tyll Frank (Belfield- IE). A very clear contribution devoted to percolations on complex networks was given by Prof. Takehisa Hasegawa, (Tokohoku-J). Fundamental issues in statistical physics and thermodynamic issues were discussed by Prof. M. Kastner, (Stellenboch- SA), Prof. Wolfram Just (London-UK) who exposes exactly soluble models describing a device subject to dry friction and noise, Prof. Klaus Kroy, (Leipzig-D) and to close a truly beautiful conference delivered by Prof. Pierre Gaspard (Bruxelles-B) who exposed some fundamental issues which occurs when extending time-reversal symmetry relations to far from equilibrium regimes.

## Summarizing

As several participants acknowledge afterwards to me directly, I feel safe to conclude that this workshop has been a success. It did trigger several new and now ongoing contacts between participants, some of them truly interdisciplinary. The logistics aspects mastered by ZiF, in particular the beautifully equipped conference room, definitely contribute to the success of these three days.