

# 25<sup>th</sup> Marian Smoluchowski Symposium on Statistical Physics

Kraków, Poland, September 9-13, 2012



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# **25th Marian Smoluchowski Symposium on Statistical Physics**

**Sunday 09 September 2012 - Thursday 13 September 2012**

## **Book of abstracts**

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**Proceedings**

As usual, proceedings of the Symposium are going to be published as a special issue of *Acta Physica Polonica B*, a refereed journal recognized by The European Physical Society and Philadelphia Institute of Scientific Information. Everybody is encouraged to contribute, but the invited talks are particularly welcome. However, all contributions will go through the regular editorial process, including peer review.

Please, visit the publishers' website for instructions to authors. Please, send your contribution to the following address only: [zfs@th.if.uj.edu.pl](mailto:zfs@th.if.uj.edu.pl). Your contribution should be typeset in LaTeX, figures in Encapsulated PostScript. We are sorry but we will not be able to handle other formats, including MS Word. Please, include a PDF of your contribution with your submission.

The submission deadline is **January 4, 2013**.

Poster Session / 55

**Lifetime of the superconductive state in long Josephson junctions in presence of non-Gaussian noise sources**

Mr. GUARCELLLO, Claudio <sup>1</sup>; Dr. AUGELLO, Giuseppe <sup>2</sup>; Dr. VALENTI, Davide <sup>3</sup>; Prof. SPAGNOLO, Bernardo <sup>4</sup>

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The effects of Lévy noise sources on the transient dynamics of long Josephson junctions (LJJ) are investigated in the presence of both a periodical current signal and a noise source with Gaussian, Cauchy-Lorentz or Levy-Smirnov probability distributions.

In particular, by numerically integrating the Sine-Gordon equation, the mean escape time (MET) from the superconductive metastable state is obtained as a function both of the frequency of the periodical force and amplitude of the noise signal. We find resonant activation (RA) and noise enhanced stability (NES). Significant changes in RA and NES are observed by using Lévy noise sources with different statistics. MET is also studied as a function of the junction length, both for spatially homogeneous and inhomogeneous bias current distributions. In the latter case an enhanced non-monotonic behavior is observed in the presence of Gaussian noise. Conversely, the non-monotonic behavior results to be significantly reduced or completely absent for different statistics of the noise source.

Sunday Session / 118

**Smoluchowski Symposia: Why are we here?**

Dr. GÓRA, Paweł <sup>1</sup>

<sup>1</sup> *Jagiellonian University*

A popular talk on Marian Smoluchowski, statistical physics, and Marian Smoluchowski Symposia – their past, present and future.

Poster Session / 19

**Dynamics and energetics of a molecular zipper under external driving**

Mr. HOLUBEČ, Viktor <sup>1</sup>; Prof. CHIVOSTA, Petr <sup>1</sup>; Prof. MAASS, Philipp <sup>2</sup>; Mr. RYABOV, Artem <sup>3</sup>

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We investigate the dynamics of a single-ended N-state molecular zipper based on a model originally proposed by Kittel. The molecule is driven unidirectionally towards the completely unzipped state with increasing time  $t$ , where the driving lowers the energies of states with  $k$  unzipped links by an amount proportional to  $kt$ . We solve the Pauli rate equation for the state probabilities and the partial differential equations, which yield the probability distributions for the work performed on the zipper and for the heat exchanged with the thermal reservoir. Similarly to the related equilibrium model, two different regimes can be identified at a given temperature with respect to the released molecular degrees of freedom per broken bond. In these two regimes the time evolution of the state probabilities as well as of the work and heat distributions show a qualitatively different behavior.