

CATEGORICAL KAEHLER GEOMETRY AND APPLICATIONS

Bulgarian National Scientific Program "VIHREN"

Project № KP-06-DV-7; January 2020 – December 2024

<https://icms.bg/ckga>

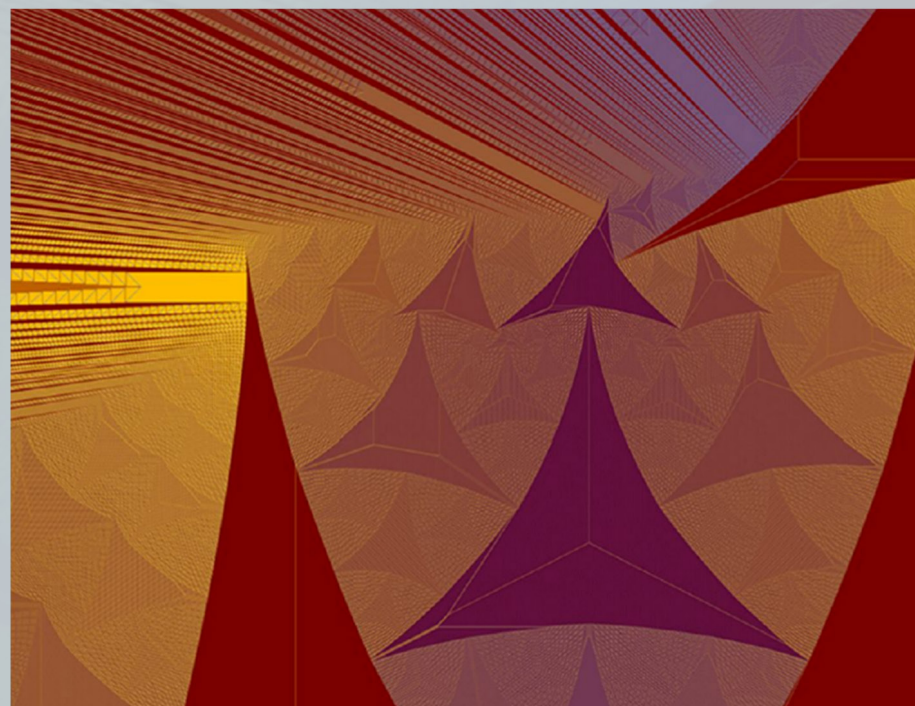
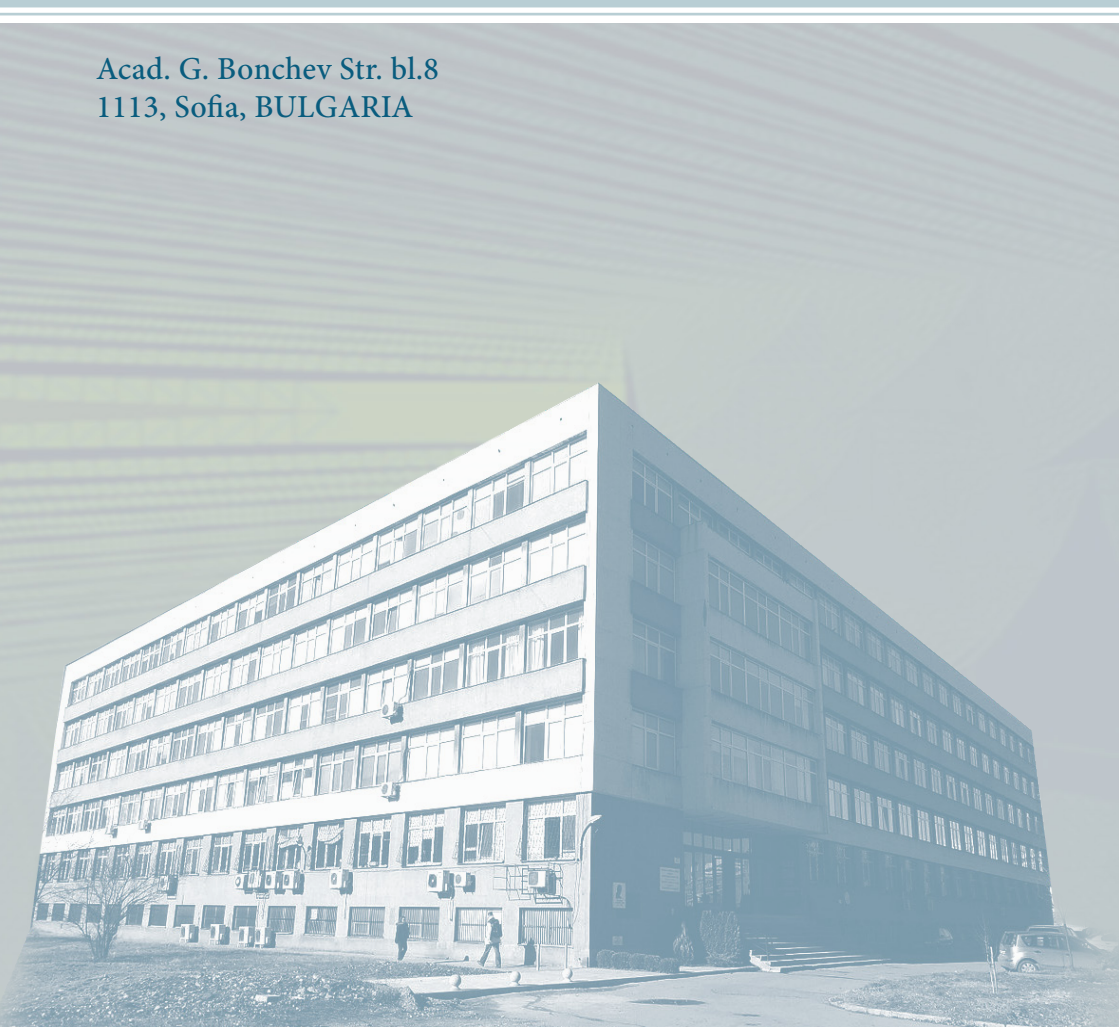


CATEGORICAL KAEHLER GEOMETRY AND APPLICATIONS

PRINCIPAL INVESTIGATOR: LUDMIL KATZARKOV

Host institution:
Institute of Mathematics and Informatics
Bulgarian Academy of Sciences

Acad. G. Bonchev Str. bl.8
1113, Sofia, BULGARIA



Birational Geometry is a classical mathematical discipline whose roots go back to ancient Greece. Nevertheless, it still offers many hard unsolved problems. The core part of this project is tackling them with cutting edge modern methods coming from the Homological Mirror Symmetry (HMS) program. HMS is used to produce new unexpected applications of symplectic topology to algebraic geometry, to answer classical open problems in birational geometry,

and to ultimately bring a quite new perspective on the way geometry is done today.

Technically our approach is based on Categorical Kaehler geometry – a direction developed by M. Kontsevich and L. Katzarkov. The progress in the categorical Kaehler geometry will be disseminated during several events in the International Center for Mathematical Sciences at the Institute of Mathematics and Informatics of the Bulgarian Academy of Sciences (ICMS – Sofia).

TEAM

Ludmil Katzarkov, Principal Investigator;
 Stefan Ivanov, Established Researcher;
 Alexander Petkov, Recognized Researcher;
 Enrique Ruby Becerra, Postdoctoral Student;
 Marin Genov, PhD Student

INTERNATIONAL COLLABORATORS

Denis Auroux, Maxim Kontsevich, Ernesto Lupercio, Dmitri Orlov, Tony Pantev, Artan Sheshmani, Carlos Simpson

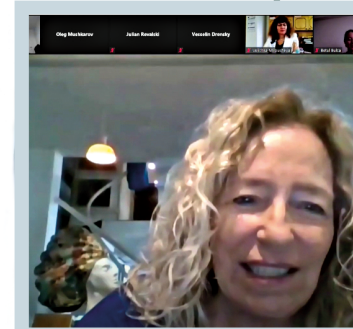
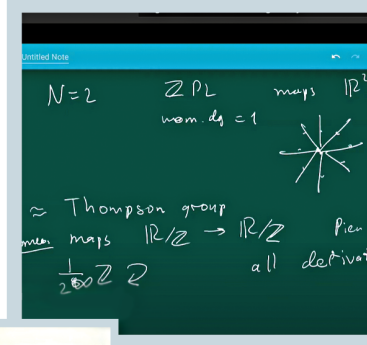
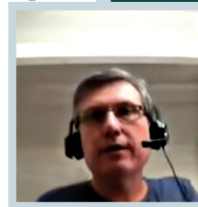
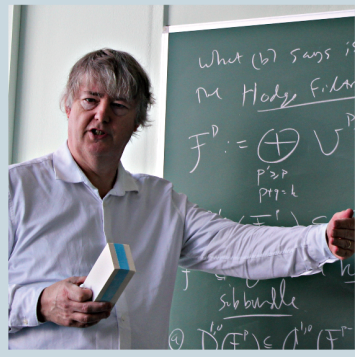
Events:

- Educational Workshop Hodge theory and local systems, March 3 - 5, 2020

- Maxim Kontsevich, Webinar Integral PL actions from birational geometry, August 17, 2020

- Online conference Women in Mathematics in South-Eastern Europe, December 10 – 11, 2020

- Colloquium talk of Terence Tao in memory of Acad. B. Sendov, January 26, 2021



The desired contradiction is established by combining previous results in the literature with the following two new results:

The case when a is near the origin (T., 2020)
 If $a = \alpha(\frac{1}{\log n})$ then we can derive a contradiction.

The case when a is near the unit circle (T., 2020)
 If $1 - \alpha(1) \leq a \leq 1 - \epsilon_0^2$ for some fixed $\epsilon_0 > 0$ then we can derive a contradiction.

