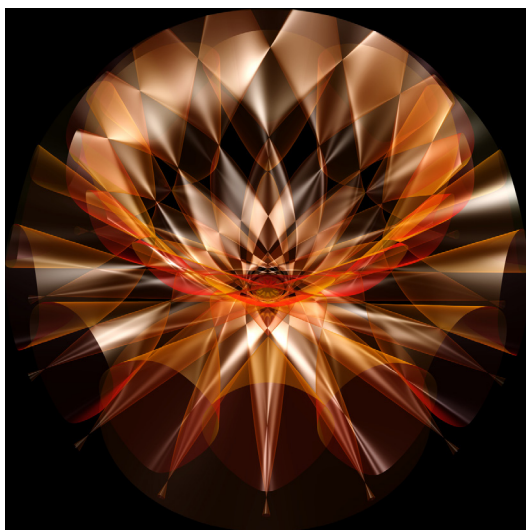## Friday 2 December 2022 at 14:15

HU Berlin, Erwin-Schrödinger Zentrum, Room 0'115   *Tea & Cookies starting at 13:00!*

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Bruno Klingler
(HU Berlin)

Hodge theory, between algebraicity and transcendence

Hodge theory, as developed by Deligne and Griffiths, is one of the main tools for analyzing the geometry and arithmetic of complex algebraic varieties, that is, solution sets of algebraic equations over the complex numbers. It associates to any complex algebraic variety an apparently simple linear algebra gadget: a finite dimensional vector space over the rationals, whose complexification is naturally endowed with two filtrations. Hodge theory occupies a central position in mathematics through its relations to differential geometry, algebraic geometry, differential equations, and number theory.

It is an essential fact that at heart Hodge theory is not algebraic, but rather the transcendental comparison of two algebraic structures. On the other hand, some of the deepest conjectures in mathematics (the Hodge conjecture and the Grothendieck period conjecture) suggest that this transcendence is severely constrained. This talk aims to show how tame geometry, whose idea was introduced by Grothendieck in the 1980s as a generalization of real semi-algebraic geometry and developed by model theorist as o-minimal geometry, appears as a natural framework to control this transcendence.

Bruno Klingler completed his PhD in Paris under Yves Benoist's supervision. After being an assistant professor at Yale University and University of Chicago, he was a professor at Université Paris 7. He moved to Humboldt-Universität zu Berlin in 2017 as an Einstein Professor. He was awarded an ERC Advanced Grant in 2021 and was an invited speaker at the ICM 2022 in the sections "Complex and algebraic geometry" and "Number theory".

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