OIST OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

THEORETICAL SCIENCES VISITING PROGRAM

TSVP TALK

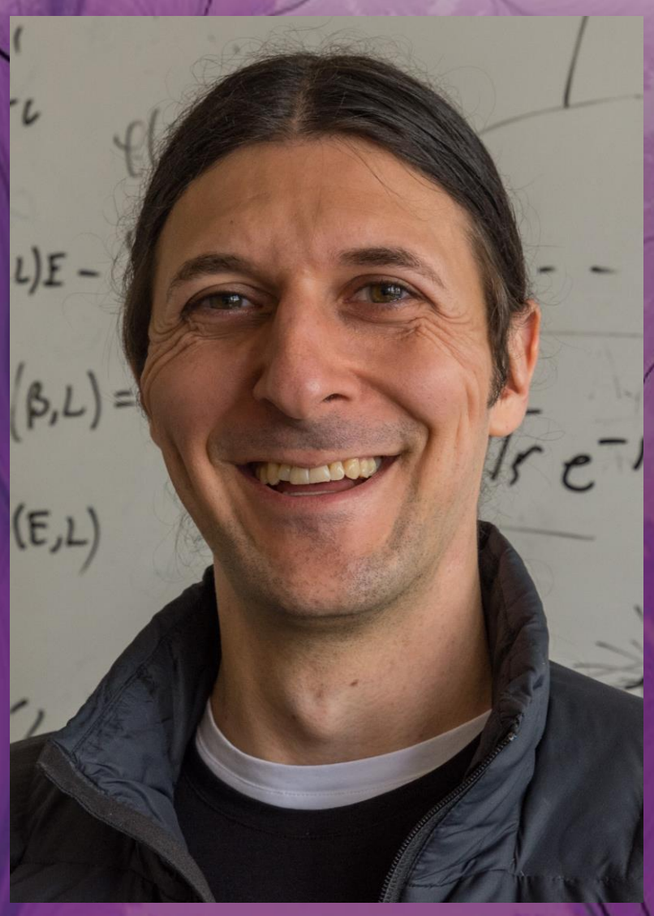
The Mathematics of the Physics of a Trillion Degrees

2026 Wed. Feb. 18

13:00–14:00

HYBRID L5D23, ZOOM

For zoom and other details scan QR code or visit oist.jp/visiting-program



A microsecond after the Big Bang, all of space existed at a trillion degrees, one hundred thousand times hotter than the center of the sun. 13.8 billion years later, massive collaborations of thousands of scientists recreate these conditions of the early universe thousands of times a second in one of the most expensive and complicated science experiments ever attempted.
In this talk, I'll first provide a general introduction to the physics explored in these Little Bangs, ephemeral fireballs that--during their lifetimes of less than a billionth of a trillionth of a second--are droplets of the hottest, most perfect fluid in the universe. I'll then discuss the deep connections with the mathematics of 1) recent, novel work to exactly preserve continuous symmetries in the numerical solution of partial differential equations with applications at the high-energy frontier as well as "low-energy" everyday fluid flow and 2) analytic continuation, which we use to regularize quantum field theories, especially in the context of finite-sized systems.

University of Cape Town

Will Horowitz

Will Horowitz received his PhD in Physics from Columbia University in 2008. After a postdoctoral position at The Ohio State University, Will moved to the University of Cape Town in 2010.
Since arriving at UCT, Will has won several awards; founded the Society of Physics Students at UCT; established the SA-CERN Excellence Bursaries; and created and directs the South African Theory and Computational School (SATACS). SATACS is the first semi-virtual postgraduate-level teaching platform in Physics and Mathematics in South Africa.
Will's research interests lie in quantum field theory, string theory, numerical methods, and the foundations of classical and quantum mechanics.

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