Berlin Mathematical School

BMS Friday Colloquium

Friday 5 July 2019 at 14:00

Erwin Schrödinger-Zentrum, Rudower Chaussee 26, 12489 Berlin Adlershof, Conference Room 0'119
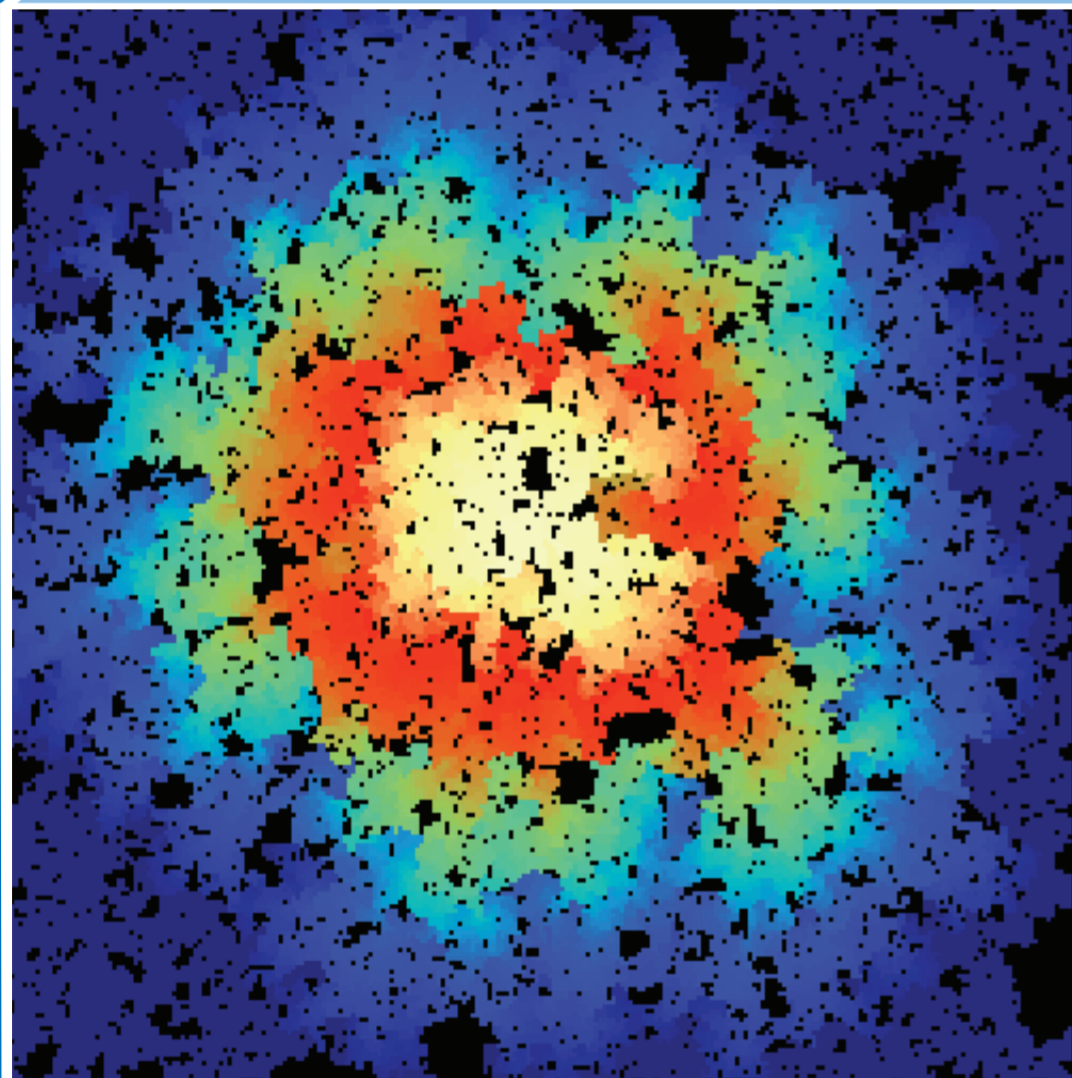
Takashi Kumagai
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Anomalous random walk and diffusion in random media

How does heat transfer on a medium? It can be mathematically understood by solving the heat equation, which is the partial differential equation that describes the physical phenomena. There is in fact another approach to analyze the heat equation, namely the probabilistic approach. This is to construct Brownian motion on the medium (or random walk if the medium is discrete) and to obtain properties of the solution of the heat equation by analyzing the Brownian motion (random walk). It is intuitive in that the properties of the solution can be obtained by the behavior of particles. Another advantage of this approach is that it is applicable to analyze the heat transfer on disordered media that have no smoothness.

In his talk, Kumagai will start by explaining Brownian motion on Euclidean space. He will then discuss Brownian motion on fractals, which are non-smooth media. The goal of this talk is to explain how to analyze random walks on random media, such as percolation clusters and random graphs, and to explain Brownian motion on them as scaling limits of the walks.

Takashi Kumagai is a professor of mathematics at the Research Institute for Mathematical Sciences (RIMS) at Kyoto University in Japan. His research focuses on anomalous diffusions on disordered media, such as fractals and random media. Kumagai completed his PhD at Kyoto U in 1994, and after working at Osaka U and Nagoya U, he accepted a position at Kyoto U in 1998. Kumagai was an invited speaker at the 2014 ICM in Seoul, and gave a Medallion Lecture at the Conference on Stochastic Processes and their Applications in Moscow in 2017. His awards include the Spring Prize of the Mathematical Society of Japan (2004) and a Humboldt Research Award (2017).

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