

KK-theory, gauge theory and topological phases

School week, 27 February – 3 March 2017 @Snellius

Workshop week, 6 – 10 March 2017 @Oort

This two-week program consisted of a one-week school and, subsequently, a one-week workshop on new developments in Kasparov theory (also referred to as KK-theory) motivated by applications to gauge theory and topological phases of matter.

School week

There were three main short courses, each of which was taught by two experts of the subject. The aim of these lectures was to get everyone “up to speed” for the upcoming Workshop, and they served this purpose excellently, providing very clear expositions on the subjects of the program. Each day of the School concluded with a discussion session, where the participants were invited to raise their doubts about the lectures, or to ask for clarifications regarding some of the points that were raised during them. This favoured a thorough understanding of the subjects taught, as well as the possibility to debate the physical motivations and applications for the mathematical tools that were illustrated and developed in the courses.

Workshop week

The five-days Workshop followed the School and built on the topics introduced there. Elaborating on the material presented in the School, the newest uses of KK-theory in index theory, gauge theories and topological phases of quantum matter were illustrated by leading experts. The speakers reported on cutting-edge research, recently developed in the fields of interest to the program. The more topical advancements and applications of KK-theory were debated both alongside the presentations and during dedicated discussion sessions, which served as well as a means to outline future lines of investigation for the communities which came together during this program. Several topics were discussed in these sessions, like implications of the theoretical models, possible predictions and challenges for the physics community, but also more technical aspects related to the unbounded Kasparov product.

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Organizers

Alan Carey, Australian National University.

Steve Rosenberg, Boston University.

Walter D. van Suijlekom, Radboud University Nijmegen.