

Oberseminar Topologie: 16.12.2019

**Manuel Krannich (Cambridge University, UK)**

„A homological approach to pseudo-isotopy theory.”

Abstract:

There is an intimate connection between algebraic K-theory and the space of pseudo-isotopies  $P(M)$  of a compact  $d$ -manifold  $M$  (that is, diffeomorphisms of a cylinder  $M \times I$  that are the identity on  $M \times 0$  and  $\partial M \times I$ ). Classically, the pseudo-isotopy space  $P(M)$  is studied in two steps: there is a stabilisation map  $P(M) \rightarrow P(M \times I)$  which is approximately  $d/3$ -connected by a deep result of Igusa, and the colimit has a description in terms of Waldhausen's algebraic K-theory of spaces due to Waldhausen--Jahren--Rognes' stable parametrised h-cobordism theorem.

In this talk, I will focus on the case of an even-dimensional disc and explain a new method to relate its space of pseudo-isotopies to the algebraic K-theory of the integers, independent of the usual route. When combined with work of Goodwillie and of Randal-Williams, one consequence of this approach is that the stabilisation map  $P(M) \rightarrow P(M \times I)$  for 2-connected  $d$ -manifolds  $M$  is rationally about  $d$ -connected, which is essentially optimal.