Seminar

Prof. Detlev Buchholz

U Göttingen

Linking numbers in quantum field theory

Thursday, April 4, 2019

at 13:30 h

ESI, Schrödinger Lecture Hall

Abstract: Tensor fields in the framework of local quantum field theory, which are closed two-forms on Minkowski space, are frequently treated as being exact by proceeding to vector potentials on indefinite metric spaces (gauge fields). In this talk it is discussed whether this step is always possible. It is shown that the commutator of pairs of such closed tensor fields, integrated about spatial surfaces with spacelike separated boundaries, are central elements of the algebra of all local fields; moreover, these commutators are equal to the linking number of the respective boundaries, multiplied by some constant. The commutators are different from zero only if the theory describes massless particles. In that case, there do not exist local vector potentials for the fields, even if one proceeds to indefinite metric spaces. Examples of such fields are given. (Joint work with Fabio Ciollo, Giuseppe Ruzzi and Ezio Vasselli)

J. Yngvason

March 21, 2019