



## Oberseminar

### Geometrische Analysis, Differentialgeometrie und Relativitätstheorie

Am Donnerstag, den **12.12.2024** spricht um **14 Uhr s.t.** im Raum **S9 (C6H05)** und über Zoom

**Prof. Dr. Carla Cederbaum**  
(Universität Tübingen)

über das Thema

#### **Some thoughts on the definition of center of mass and angular momentum**

In the 1960's, using a Hamiltonian approach, Arnowitt, Deser, and Misner gave very satisfactory definitions of total energy, linear momentum, and mass for asymptotically Euclidean initial data sets sitting in an asymptotically Minkowskian spacetime. By work of Bartnik from the 1980's, we know that these quantities are well-defined, while by work of Chrusciel around the same time, we know that they transform equivariantly under the asymptotic Poincaré group of the spacetime (at least in a given asymptotic spacetime coordinate chart). In the first part of the talk, we will briefly recall these definitions and the results mentioned before, adding some details ensuring that the mentioned equivariance is indeed correct without assuming that one transforms within a given asymptotic spacetime coordinate chart.

In the second part of the talk, we will shift attention to the definitions of angular momentum and center of mass, defined via a Hamiltonian approach by Regge and Teitelboim in the 1970's and by Beig and O'Murchadha in the 1980's, respectively. We will compare these definitions with definitions given by Michel in the 2010's based on Killing initial data. We will discuss known and unknown problems related to both of these definitions and their interrelation. The insights we present rely on ongoing joint work with Senthil Velu and joint work with Nerz and with Sakovich. We will also discuss some preliminary ideas to overcome the shortcomings of these definitions.

Den Zoom-Link erhalten Sie per E-Mail von Martina Neu.

For participating online, please sign up by sending an email to Martina Neu.

Hierzu wird herzlich eingeladen.

Rodrigo Avalos, Carla Cederbaum, Gerhard Huisken, zusammen mit Jan Metzger (Potsdam)