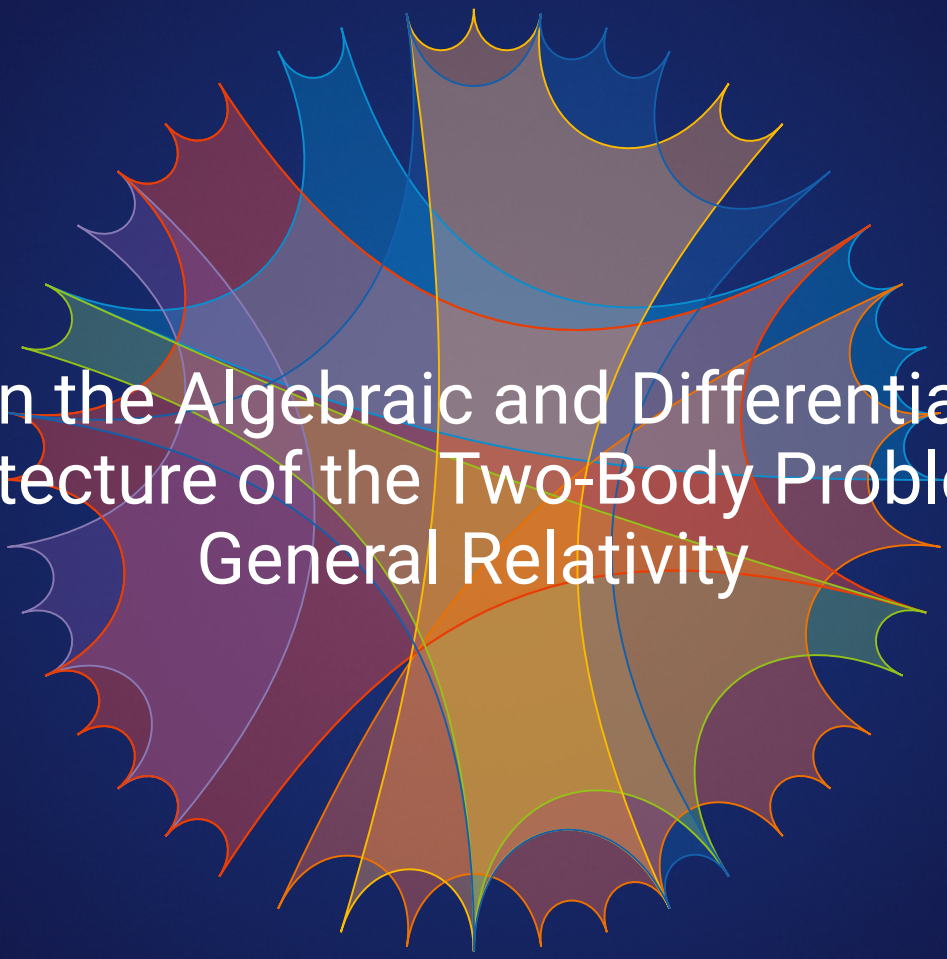
STRUCTURES
CLUSTER OF
EXCELLENCE

UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386

# STRUCTURES JOUR FIXE


## Radu Roiban

Penn State, ETH-ITS Zürich

# On the Algebraic and Differential Architecture of the Two-Body Problem in General Relativity

**February 06, 2026, 1:30 PM, Phil 12 GHs**

COFFEE & SNACKS IN ROOM 106

ZOOM: Meeting ID: 935 6549 3662, Code: 928036

CONTACT: office@structures.uni-heidelberg.de

**STRUCTURES**
CLUSTER OF
EXCELLENCE

**UNIVERSITÄT**
**HEIDELBERG**
ZUKUNFT
SEIT 1386

# ABSTRACT

The two-body problem remains a cornerstone of gravitational-wave physics, yet its exact solution in general relativity is notoriously difficult due to nonlinearities and radiation. This talk explores how we can trade traditional geometry for quantum field theory (QFT) structures and thus bypass some of the traditionally expensive methods of General Relativity. We examine the double-copy relation, which maps gauge theory to gravity, and the connection of observables to systems of linear differential equations. By investigating these understood structures, we identify the mathematical bottlenecks and the not yet thoroughly understood connections to special functions, the fate of unphysical singularities, and the asymptotic structure of spacetime.

ZOOM: Meeting ID: 935 6549 3662, Code: 928036
CONTACT: office@structures.uni-heidelberg.de