

**Plenarvortrag** PV XI Do 9:15 HS 1  
**Variational concepts in General Relativity** — ●GERHARD HUISKEN — Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Am Mühlenberg 1, 14476 Golm, Germany

Variational principles play an important role in understanding solutions of the Einstein field equations. Structures arising from variational principles are for example maximal surfaces, constant mean curvature surfaces and harmonic maps in the construction of useful coordinate gauges or marginal outer trapped surfaces (MOTS) in the descrip-

tion of black hole horizons. Geometric variational principles are at the heart of our understanding of positive mass theorems and the Penrose inequality and help to identify coordinate invariant structures in space-time. In addition, the exploitation of variational structures present in the Einstein equations can be useful in constructing better algorithms in numerical relativity.

The lecture gives an overview of recent progress in Mathematical Relativity related to geometric variational principles in space-time with a particular view to mass/energy inequalities and concepts for quasi-local mass and the center of mass for isolated gravitating systems.