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E I N L A D U N G

im Rahmen des Literaturseminars

zum Vortrag

von

Stefan Palenta

(Vienna)

über

„Nonlinear Interactions of Gravitational Waves“

ABSTRACT:
After an introduction on gravitational waves and nonlinear effects in general, the talk will present the foundations of a new solution technique for the characteristic initial value problem of colliding plane gravitational waves. Assuming plane symmetry, the Einstein equations essentially reduce to the Ernst equation. In the course of the inverse scattering method this nonlinear PDE is tranlated first into an overdetermined linear system of differential equations and secondly into a Riemann-Hilbert problem. Ambiguities in this Riemann-Hilbert problem's solution lead to the construction of families of exact spacetimes generalising the proper solution to the initial value problem. Therefore the presented technique also serves as a solution generating technique. The method is exemplified by generalising the Szekeres class of colliding plane wave spacetimes. A new type of circularly polarised impulsive gravitational waves is identified within this generlisation.

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Ort: Arbeitsgruppe Gravitation, Währinger Straße 17, **Raum 218,** 2. Stock

gez.: P. Chrusciel