

## Ministry of Science and Higher Education

**Republic of Poland** 

Contribution ID: 97

Type: Oral presentation (preferred)

## Towards a theory of nonlinear gravitational waves: a systematic approach to nonlinear gravitational perturbations in vacuum

Tuesday 26 September 2017 12:40 (20 minutes)

I will present a systematic and robust approach to nonlinear gravitational perturbations of vacuum spacetimes. In particular, I will show that the system of perturbative Einstein equations reduces at each perturbation order to two (for each gravitational mode in 3 + 1 dimensions on which our study is focused) scalar wave equations, and then we show how the metric perturbations can be explicitly obtained, once the solutions to these scalar wave equations are known. These results show that the concept of polarization of a gravitational wave does make sense also beyond the linear approximation and provides a basis for a theory of nonlinear gravitational waves. The talk is based on a recent preprint http://arxiv.org/abs/1705.02258.

Presenter: ROSTWOROWSKI, Andrzej

Session Classification: Plenary Session 4