



## **Radiation from a D-dimensional collision of shock waves: analytic vs numerical results**

***Marco Oliveira Pena Sampaio***  
Universidade de Aveiro, Portugal

The calculation of a reliable estimate for the gravitational radiation emitted in the D-dimensional head on collision of two light-like particles remains as one of the big challenges in higher dimensional gravity. In this presentation I discuss an important step towards the understanding of this problem within the perturbative framework of D'Eath and Payne. We prove rigorously, for the first time, that there is a correspondence between the order of the perturbative expansion and of an angular expansion around the axis of collision, so that the angular dependence completely factorises. We also prove that it is possible to obtain all first order asymptotic metric functions in closed form, resulting in the analytic proof of the (previously) enigmatic result that the first order inelasticity is given by the formula  $1/2-1/D$ . We conclude with some comments on the role of the (recently constructed) Penrose diagram for the problem which clarifies the causal structure of the spacetime and the calculation of the metric functions at higher orders.