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SALZBURG MATHEMATICS COLLOQUIUM
Summer 2025

Frédéric Hélein (Université Paris Diderot)

„Kaluza-Klein theories without a priori fibration hypotheses“

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Abstract:

I will present a Lagrangian action on fields, the critical points of which lead to solutions of the Einstein-Yang-Mills equations, in the spirit of Kaluza-Klein theories. The novelty is that the a priori fiber bundle structure hypothesis is not required: fields are defined on a "space-time" Y of dimension $4 + r$ without any a priori principal bundle structure, where r is the dimension of the structure group. If the latter group is compact and simply connected, to each solution of the Euler-Lagrange equations it corresponds a 4-dimensional pseudo-Riemannian manifold X (which can be interpreted as our usual space-time) in such a way that Y acquires a principal bundle structure over X equipped with a connection.

Moreover the metric on X and the connection on Y are solutions of the Einstein-Yang-Mills system. If the structure group is $U(1)$ (the case which corresponds to the Einstein-Maxwell system) the situation is slightly degenerated and supplementary hypotheses are necessary.

Thursday, **15:00-15:45**
Hörsaal 414, 1. Stock

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