

Kaluza-Klein theories without a priori fibration hypotheses

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I will present a theory based on a variational principle, 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 fibration hypothesis is not required: fields are defined on a “space-time” Y of dimension $4 + r$ without a priori principal bundle structure, where r is the dimension of the structure group. If this group is compact and simply connected solutions it allows to construct a 4-dimensional manifold X which can be interpreted as our space-time, in such a way that Y acquires a principal bundle structure over X and produce 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.

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