

Why Yang-Mills theories?

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Abstract

The elucidation of the gauge principle "is the most pressing problem in current philosophy of physics" Redhead. This paper argues two points that contribute to this elucidation in the context of Yang-Mills theories. 1) Yang-Mills theories, including quantum electrodynamics, form a class. They should be interpreted together. To focus on electrodynamics is a mistake. 2) The essential role of gauge and BRST surplus is to provide a local theory that can be quantized and would be equivalent to the quantization of the non-local reduced theory.

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