

On the Hamiltonian generators of space-time translations in gauge theories

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For free scalar or spinor fields, space-time translations are generated in the phase space of fields by virtue of the associated conserved Noether charges, i.e. by the components of the canonical energy-momentum vector of fields. This is not the case for gauge fields due to the gauge invariance of the Lagrangian. For the latter theory, we discuss how the canonical expressions can be extended following Dirac's treatment of constrained Hamiltonian systems so as to construct a "kinematical energy-momentum vector" for gauge fields which generates space-time translations of fields.