On the notion of energy-momentum tensors in Finsler spacetimes

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It is frequently claimed that in a Finsler spacetime setting the energy-mentum tensor cannot, or should not, be a tensor field on the spacetime manifold but rather a tensor-valued map on the tangent bundle of the spacetime manifold. In other words, it is claimed that the components $T_{\mu\nu}$ of the energy-momentum tensor should depend on the spacetime coordinates and on the induced velocity coordinates. In this talk I will argue, from a physical point of view, against this claim. I will consider the energy-momentum tensor of an electromagnetic field as an example, and also the energy-momentum tensor of a fluid from kinetic theory. The consequences of this reasoning for possible generalisations of Einstein's field equation into a Finsler setting will also be discussed.