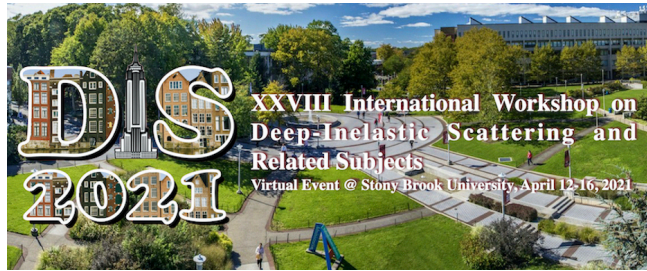


XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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Energy-Momentum Tensor Form Factors in QED

Thursday, 15 April 2021 09:30 (18 minutes)

The global properties of particles can be studied through the Energy-Momentum Tensor (EMT) matrix elements. The forward EMT matrix elements allow one to construct different types of mass/energy decompositions, whereas the off-forward EMT matrix elements carry information on the distribution of energy, angular momentum, pressure and shear forces in the particles.

The structure of the EMT for QED and QCD is similar and, in particular, both theories have a trace anomaly contribution. Therefore, the QED case can be used as a benchmark calculation to explore the physics contained in the EMT matrix elements.

We present the results for the separate photon and electron contributions to the different EMT form factors in QED.

We will focus the discussion on the so-called D-term which is the “last unknown global property” of particles beyond the more familiar mass and spin. The D-term is not fixed by general principle and it gives access to the distribution of pressure and shear forces of a particle.

The presentation is based on:

[1] A. Metz, B. Pasquini, S. Rodini,
“D-term form factor for the electron in QED”.
In preparation

[2] A. Metz, B. Pasquini, S. Rodini,
“Revisiting the proton mass decomposition”.
Phys. Rev. D102 (2020) 114042

[3] S. Rodini, A. Metz, B. Pasquini,
“Mass sum rules of the electron in quantum electrodynamics”.
JHEP 09 (2020) 067

Primary authors: METZ, Andreas (Temple University); PASQUINI, Barbara (University of Pavia and INFN, Pavia); RODINI, Simone (University of Pavia & INFN Pavia)

Presenter: RODINI, Simone (University of Pavia & INFN Pavia)

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