

# Matrix elements of the energy-momentum tensor in the hydrogen atom

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This talk will present radiative corrections and their interpretation for the so-called  $D$ -term. This is related to the Electron-Ion Collider project in the Brookhaven National Laboratory, USA, where Generalized Parton Distributions (GPD) will be measured. GPD give access to matrix elements of the energy-momentum tensor of a nucleon. The  $D$ -term is sometimes roughly interpreted as characterizing pressure distribution. Calculated in simple bound states such as the hydrogen atom it exhibits an interesting new type of a logarithmic correction that resembles the Lamb shift [1, 2] but has a different physical interpretation [3].

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- [1] X. Ji and Y. Liu, *Momentum-Current Gravitational Multipoles of Hadrons*, Phys. Rev. D **106**, 034028 (2022), 2110.14781.
  - [2] X. Ji and Y. Liu, *Gravitational Tensor-Monopole Moment of Hydrogen Atom To Order  $\mathcal{O}(\alpha)$*  (2022), 2208.05029.
  - [3] A. Czarnecki and Y. Liu, to be published.