Abstract Submitted
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Electron structure: Shape, size, and generalized parton distributions in QED[1] GERALD A. MILLER, Univ of Washington — The shape of the electron is studied. Quantities of interest for the proton: Form factors, generalized parton distributions, transverse densities, Wigner distributions and the angular momentum content–are computed for the electron-photon component of the electron wave function. The influence of longitudinally polarized photons, demanded by the need for infrared regularization via a nonzero photon mass, is included. The appropriate value of this mass depends on experimental conditions, so the size of the electron (defined by the slope of its Dirac form factor) bound in a hydrogen atom is found to be about four times larger than when the electron is in a continuum scattering state. The shape of the electron, as determined from the transverse density and generalized parton distributions, is shown not to be round. An electron distribution function (analogous to the quark distribution function) is defined, and that of the bound electron is shown to be suppressed compared to that of the continuum electron. If the relative transverse momentum of the virtual electron and photon is large, the virtual electron and photon each carry nearly the total angular momentum of the physical electron (1/2), with the orbital angular momentum being nearly (?1/2).

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