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Possibility for a New Measurement of the Proton Elastic Form Factor Ratio at Very Low Q^2 GUY RON, Lawrence Berkeley National Lab, ELI PIASETZKY, Tel Aviv University, BOGDAN WOJTSEKHOWSKI, Jefferson Lab — The proton form factors at low Q^2 encode information about the peripheral structure of the proton as well as the interplay between the magnetic and electric charge distributions. Furthermore, low Q^2 form factor measurements impact high precision experiments, for example, the measurement of the hydrogen hyperfine splitting. Polarization transfer and beam target asymmetry measurements allow to determine the electric to magnetic form factor ratio with high precision down to $Q^2 \simeq 0.15$ GeV^2. A recently completed experiment at JLab has recently taken data with unprecedented precision down to $Q^2 \simeq 0.3$ GeV^2, with a further experiment approved to extend the Q^2 range down to 0.015 GeV^2. At even lower Q^2 the beam-target asymmetry method is impeded by the need to detect either a very forward electron or to use a low energy beam which must traverse the high magnetic field of a polarized target. A recoil polarization measurement at lower Q^2 is impossible due to the very low energy of the recoil proton. We suggest an alternative measurement using colliding proton and electron beams which will allow a measurement of the form factor ratio to extremely low Q^2 ($\sim 10^{-4}$ GeV^2). The opportunity for this measurement will be discussed.

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