Electric Fields of the Sun and Solar Wind\textsuperscript{1} C. FRED DRISCOLL, University of California, San Diego — A simple model of solar electric fields explains the solar wind energetics and coronal ”heating”, invoking only gravito-electric and photo-electric forces. In the (collisional) solar interior, gravity necessarily generates a radial electric field \( eE = (-1/2)m_pg \), so protons are 50\% levitated. At the surface, this gives \( eE(R_s) = 1.4eV/Mm \) from displaced charge \( Q(R_s) = -75.Coul. \) In the (weakly collisional) outer photosphere/corona, electron scattering of the photon energy flux \( G_E \) gives \( eE = (G_E/c) \sigma_{\gamma e} \). An estimated average photon-electron cross-section \( \sigma_{\gamma e} = 3x10^{-24}m^2 \) (typical of e-\( /p^+ \) and e-\( /H \) correlations) gives \( eE = (4.eV/Mm) (r/R_s)^{-2} \), sufficient to generate the observed solar wind: protons are accelerated out of the 2.keV gravity well and up to 1.3keV kinetic energy within several \( R_s \), with total particle energy flux of \( G_E/10^6 \). This coherent proton/electron flow is the K-Corona, obviating the T=100eV hydrostatic model (Van deHulst, 1950). Filamentation (1.Mm\(^2\)) of the flow arises from the convection /recombination (“roiling”) dynamics of surface granulations, with local electric fields generating strong currents and local magnetic fields. Statistical charge fluctuations, current filamentation, and neutral gas drag on the persistent proton/electron flow produces the pervasive fluctuating magnetic fields observed by spacecraft.

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C. Fred Driscoll
University of California, San Diego

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