

Abstract Submitted
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Derivation of the Fine Structure Constant RAMIRO MONTALVO, SPAWAR Retired — A geometrically based calculation of the fine structure constant α is presented based on the known properties of the electromagnetic (EM) field and assumptions on the way the photon field may be quantized. Based on the fact that the photon field of a stationary charge has an energy density given by $\epsilon_0 E(r)^2/2$ around the charge, a radial photon field of stationary states is assumed which then interacts with the photon field of other charges. From the geometry of the configuration the interacting states are those along the line joining the two charges. Using the uncertainty principle to determine the angular extent of the interacting photons, the EM coupling constant α becomes the ratio of the interacting photons over all the photons around the sphere for one charge times the same ratio for the other charge. The answer reduces to $\alpha = [(14/75)(5)^{1/2} - 1/3]^2 = .007067$ which differs from the experimental value by 3.2%.

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