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Let's measure the F2-gamma Structure -function

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A higher energy eplus-minus collider than LEP should have a better luminometer, optimised to measure the acollinearity and energies of the leptons in Bhabha scattering events. Building upon what we did with OPAL, such a luminometer could be used to make even more accurate measurements of Q^2 in deep-inelastic gamma-gamma scattering up to much higher values than LEP could reach. A new central hadron detector would give better measurements of the invariant-mass-squared W^2 of the recoiling hadrons and give better accuracy for $x = Q^2 / (Q^2 + W^2)$.

The work still to be done includes writing and testing a Monte Carlo generator for fragmentation of the final state hadrons, so that the structure function can be unfolded from the observed distributions of x and Q^2 , in the way used by my former student Edmund Clay in the last of our published OPAL F2-gamma analyses. His thesis is available as a ps.gz file on the UCL HEP group website. The only other extra work would be to write a simulation program for the performance of the luminometer as a tagger. The hard work for this may already have been done in optimising the luminosity measurement, maybe by Sailer from DESY, for CLIC. ILC, CLIC or FCC eplus-minus should all be similar.

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