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Photons from Spectators in Relativistic Heavy-Ion Reactions EDWIN NORBECK, YASAR ONEL, University of Iowa — In a high energy Pb-Pb collision the outer parts of the Pb nuclei that do not become part of the quark gluon plasma are more than passive spectators. In reasonably central collisions the "spectator" matter is completely disintegrated into protons and neutrons. It experiences an electric field of 2 x 10^{28} V/m at the LHC design energy of 5.5 TeV/nucleon pair. In such a huge electric field the acceleration of a d or u quark or an electron is so large that almost all of the transferred energy goes into radiation. The large electric field can produce e^+ e^- pairs as it interacts with spectator matter. The electric field lasts for such a short time that an electron would acquire only 18 MeV if there were no radiation. If the radiation were isotropic in the spectator frame, the Lorentz transformation would put half of the radiation into a narrow cone that is about 10 cm wide at a distance of 140 m, where the CMS experiment has detectors. GeV photons are seen at 100,000 ft, which may be from spectators formed by collisions of cosmic Fe nuclei with air at 140,000 ft. Some of these photons arrive as clusters of a dozen or so, all within an area less than 0.01 mm across. This suggests that some of spectator radiation may occur as solitons.

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