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Photons from Spectators in Relativistic Heavy-Ion Reactions EDWIN NORBECK, YASAR ONEL, University of Iowa — There are two very different regimes in the relativistic collision of two large nuclei. The overlap region becomes a quark-gluon plasma. The parts of the nuclei that do not interact continue on in the original direction as spectators. With a large overlap (small impact parameter) the spectators are completely disintegrated into their constituent nucleons. It is to be expected that the disintegration will result in the production of many photons. As the impact parameter increases, an increasing number of nucleons remain bound as small nuclei, usually in some excited state. There will be photons from the de-excitation of the small nuclei. It will be most interesting to study the evolution of the photon spectrum as the impact parameter is increased. At an LHC collision energy of 5.5 TeV/nucleon the Lorentz transformation puts half of the photons into a cone with a half angle of only 0.34 mrad, which is 4.8 cm from the center line at a distance of 140 m from the interaction point. This fits into the 10 cm wide clear space between the incoming and outgoing beam pipes. The nuclear energy photons are boosted in energy by a factor of 2926 at the edge of the cone and twice as much in the center. The impact parameter can be measured by counting the number of spectator neutrons. The photon detector must avoid the spectator neutrons, which at 140 m are all in a spot of radius less than one cm.

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