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Studying Cosmic-Ray-Type Events Made in the Laboratory with CMS and CASTOR EDWIN NORBECK, Y. ONEL, University of Iowa, A. PANAGIOTOU, University of Athens, Greece, M. MURRAY, University of Kansas, CMS COLLABORATION — The LHC at CERN will produce collisions between heavy ions at energies heretofore seen only in cosmic rays, 1144 TeV in the center of mass for Pb+Pb. Even with a colliding beam, the core of the shower appears at very small, forward angles. The small-angle, 0.1^o to 0.8^o, reaction products will be studied with a novel quartz-tungsten calorimeter, CASTOR, and a thin tracking detector, TOTEM-2. Products going into larger angles will be measured by the rest of the huge CMS experiment. These studies will provide, for the first time, a much needed calibration for cosmic-ray air-shower detectors. Cosmic-ray literature describes a wide variety of exotic events from collisions between ions up to Fe+air. Even more exotic events could be expected from Pb+Pb. CASTOR is designed to look for a variety of exotic phenomena that have been predicted. "Strangelets" are metastable, almost neutral, nuclei with nearly equal numbers of s, u, and d quarks. Matter, comprised of u, d, and s quarks is believed to form the core of neutron stars. "Centauros" or "disoriented chiral condensates," whose nature has not been understood so far, would appear in CASTOR as an unusual distribution of the charges of pions. Also, at these angles and energy the gluons are expected to overlap to form a classical field known as a "color glass condensate."

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