Abstract Submitted
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Magnetic Monopole Atom EDWIN NORBECK, University of Iowa — A N-S monopole pair should form an atom, an analog of positronium. Such atoms might be created by colliding Pb beams at the LHC for which the available energy is 1144 TeV. The difficulty in understanding such systems can be seen by using the textbook positronium formula and Dirac's observation that the effective "charge" of a monopole (to use in Coulomb's law) is 67.5 n times the electron charge. Even with the integer n = 1, the energy radiated by a pair of poles as the atom cascades to the ground state is 147 times the rest energy of the pair, in violation of energy conservation. Relativistic corrections increase this value. Vacuum polarization effects give a large correction in the right direction, but the usual QED can not be used because the magnetic fine structure constant is huge, 137/4. Even without detailed calculations it can be assumed that the mass of the atom is much smaller than the mass of two free poles. As a newly produced pair begins to separate, one could expect additional poles to be produced from the vacuum resulting in two atoms moving away from each other. These atoms would self annihilate resulting in back to back jets.

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