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Nonlinear vacuum polarization in intense blackbody radiation and its effects on the radiation spectrum SHELDON WU, FREDERIC HARTEMANN, CRAIG SIDERS, CHRISTOPHER BARTY, Lawrence Livermore National Laboratory — A study of thermally induced vacuum polarization stemming from the Euler-Heisenberg radiation correction to Maxwell equations is conducted. While nonlinear effects associated with interactions of electromagnetic pulse with a background photon gas had been previously calculated, we examine the possibility of nonlinear corrective terms to the blackbody radiation spectrum. Suitable conditions can be found in both astrophysical and laboratory environments. Inertial confined, ignited thermonuclear plasmas will produce intense blackbody radiation at temperatures in excess of 20 keV. In this theoretical investigation, our analysis shows that in an ideal incoherent blackbody the radiation spectrum is unaffected in the regime studied. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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