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Optical gyrotropy as a test for dynamic chiral magnetic effect of Weyl semi-metals[1] SUMANTA TEWARI, Clemson University, Clemson, SC, USA, PALLAB GOSWAMI, National High Magnetic Field Laboratory and Florida State University, Tallahassee, FL, USA, GIRISH SHARMA, Clemson University, Clemson, SC, USA — We identify the dynamic chiral magnetic effect and the optical gyrotropy as the manifestations of the same physical phenomenon, namely the dynamic magnetoelectric effect. We show that the measurement of natural optical activity for the transmitted light or the rotary power provides a direct confirmation of the existence of the dynamic chiral magnetic effect. We derive a general formula for the gyrotropic conductivity of a noncentrosymmetric metal in the high frequency limit, and apply our results to the special cases of inversion symmetry breaking Weyl semimetals and noncentrosymmetric cubic metals.

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