Abstract Submitted
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Why is the optical transparency of graphene determined by the fine structure constant?[1] DANIEL E. SHEEHY, Louisiana State University, JOERG SCHMALIAN, Ames Lab and Iowa State University — The observed 97.7% optical transparency of graphene [R.R. Nair, et al, Science **320**, 1308 (2008)] has been linked to the value 1/137 of the fine structure constant, by using results for noninteracting Dirac fermions. The agreement in three significant figures requires an explanation for the apparent unimportance of the Coulomb interaction. Using arguments based on Ward identities, the leading corrections to the optical conductivity due to the Coulomb interactions are correctly computed (resolving a theoretical dispute) and shown to amount to only 1-2%, corresponding to 0.03-0.04% in the transparency.

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