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Optical response of dark exciton Bose-Einstein condensate MIKHAIL EREMENTCHOUK, MICHAEL LEUENBERGER, University of Central Florida — We study the optical response of Bose-Einstein condensate (BEC) formed by dark excitons in semiconductors. We consider the example of GaAs, where dark excitons are formed by heavy-holes and electrons with opposite signs of projections of their spins resulting in natural fragmentation of the condensate. Direct coupling of such excitons is dipole prohibited and, therefore, the optical response of semiconductor with dark condensate is provided through interaction of light with bright exciton states. We show that the Coulomb interaction of optically excited bright excitons with dark excitons residing in the BEC leads to effective renormalization of characteristics of bright excitons — e.g. their mass decreases — dependening on the density of the condensate. As a result the exciton resonances experiences red-shift with decreasing amplitude. This provides an opportunity for indirect spectroscopy of dark exciton BEC.

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