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**Bi-layer excitons in two-dimensional layered materials**[1] MAHESH NEUPANE, GEN YIN, DARSHANA WICKRAMARATNE, ROGER LAKE, University of California, Riverside — Following the prediction of exciton condensation in closely spaced two-dimensional electron-hole bilayer systems [1], there has been a sustained theoretical and experimental investigation of this condensation phase in coupled quantum well material systems. The electron-hole pairs are bound by the interlayer Coulomb interaction, which is tuned by electrostatic gating of the charge density [2]. The magnitude of this interaction is determined by the binding energy between the electron and the hole. Improvements in the exciton binding energy can be achieved by an appropriate choice of materials. The family of van der Walle materials is considered in this study, and the effect of material choice and insulating layer thickness on the excitonic properties will be discussed and compared to experimental investigations using traditional GaAs-AlGaAs coupled quantum wells.

[1] Y. Lozovik and V. Yudson, JETP Letters, vol. 22, 1975
[2] J. Shumway and M.J. Gilbert, Phys. Rev. B., vol. 85, no. 3, 2012

[1]Microelectronics Advanced Research Corporation Focus Center on Nano Materials (FENA)

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