

Abstract Submitted  
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**Excitonic condensation in spatially separated 1D systems<sup>1</sup>** DAVID ABERGEL, NORDITA — We introduce the concept of excitonic condensation between spatially separated ground state populations of 1D electrons and holes mediated by their attractive direct Coulomb interaction. Candidate systems for observing this phenomenon include semiconductor quantum wires, core-shell nanowires, stacked graphene nanoribbons, and carbon nanotubes. We focus on the core-shell nanowire system and present calculations of the excitonic gap (which characterizes the stability of the condensate) and the critical temperature of the condensate. We also discuss additional effects such as the dependence on the material parameters, the presence of multiple bands, and spin or valley degeneracy. We show that 1D systems may have substantial improvement in the critical temperature of the condensate over comparable 2D systems because the screening of the inter-layer Coulomb interaction is weaker.

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