Exciton binding and instabilities in quasi-1d Carbon based systems

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I will discuss the effects of dimensionality and reduced screening on electron-hole binding in selected quasi-1d Carbon based systems, as obtained from large scale Many Body Perturbation Theory calculations.

I will focus on two examples: (i) realistic graphene nanoribbons, showing strongly bound excitonic signatures in spectroscopies, and (ii) zero-gap C nanotubes where electronic correlations are predicted to induce a transition to the long-sought 'excitonic insulator' ground state, as also confirmed by quantum Monte Carlo calculations.

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