Giant Exciton Binding Energy Driven by Dimensional Confinement and Magnetic Properties in van der Waals materials

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Two-dimensional (2D) materials demonstrate one of the highest binding energies around 0.5 eV owing to their quantum and dielectric confinement [1-10]. Here, we extrapolate this result to their bulk counterparts layered van der Waals (vdW) crystals with binding energies above 1 eV. Moreover, we show that magnetic properties in vdW materials further enhance Coulomb interaction. As a result, we formulate a universal law of exciton binding energies for both monolayers and bulk van der Waals materials.

References

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