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[131] Ultra-fast carriers and gap dynamics of Black Phosphorus

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Black phosphorus (BP) consists of a layered puckered structure of P atoms in a hexagonal arrangement, with outstanding optical, [1] electrical [2] and thermal properties [3].

Unlike his carbon counterpart graphene, it exhibits a thickness-dependent electronic band gap, spanning from 2 eV for phosphorene (single layer) down to 0.33 eV for bulk BP.

Our trARPES experiment now shows that the electronic structure of BP undergoes dramatic transient changes, namely a complete or almost complete gap closure, when the system is excited by an ultrafast IR pulse.

Jia, Y. et al., Nat. Commun., 5, 1–6 (2014)
Li L. et al., Nat. Nanotec., 9, 372–377 (2014)
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