Abstract Submitted
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Anisotropy in the optical properties of bulk and layered transition metal dichalcogenide ReS_2 SUVADIP DAS, NIHAR PRADHAN, CARLOS GARCIA, DANIEL RHODES, STEPHEN MCGILL, LUIS BALICAS, EFSTRATIOS MANOUSAKIS, National High Magnetic Field Lab. & Dept. Physics, Florida State Univ. — Unlike most transition metal dichalcogenides, ReS_2 in the distorted $1T'$ phase, is a direct gap semiconductor. We measured the temperature dependent photoluminescence in both bulk and layered ReS_2 and examined the evolution of the peaks with the number of layers. We obtained strong signatures of optical anisotropy in the absorption spectroscopy and photocurrent response which makes this material a potential candidate for optoelectronic applications. Many body calculations including electron-hole interactions as implemented in the GW+BSE approach, agrees with the strong anisotropy in the optical properties of bulk and monolayer ReS_2. A shift in the excitonic peaks by about 0.8 eV introduced by solving the Bethe-Salpeter equation indicates strong contribution from excitonic bound states in this transition metal dichalcogenide.

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