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Degenerate Four-Wave Mixing near the Excitonic Resonances of Bulk MoS_2 BRIAN KO, Baylor University/Texas AM University, ZHENRONG ZHANG, Baylor University, ALEXEI SOKOLOV, Texas AM University/Baylor University, HO WAI LEE, Baylor University/Texas AM University, MARLAN SCULLY, Texas AM University/Baylor University/Princeton University — MoS_2 is a two-dimensional semiconductor with a direct bandgap in the visible regime (1.88 eV), making it a promising candidate for optoelectronic and photonic applications, such as Raman enhancement. However, near the bandgap, the photoluminescence of MoS_2 disturbs the Raman signal, reducing enhancement. In the bulk limit, MoS_2 transitions to an indirect semiconductor while retaining the direct excitonic transition at 1.88 eV. In our experiment, we observe a four-wave mixing (FWM) signal generated by a bulk MoS_2 flake using a broadband coherent anti-Stokes Raman spectroscopy setup. We observe a resonance at 680 nm, corresponding to the energy of the excitonic transition. This resonance occurs due to the increased third-order nonlinear susceptibility at wavelengths near the excitonic transition. This phenomenon could open the path to using MoS_2 as a flat substrate for four-wave mixing processes such as coherent anti-Stokes Raman spectroscopy..

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