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Quantum Spin Fluctuations and magnons in antiferromagnetically coupled bilayers with tuneable intra-bilayer exchange - the case of $Cr_2W(Te)O_6$[1] KINGSHUK MAJUMDAR, Grand Valley State Univ, S. D. MAHANTI, Michigan State University, East Lansing — Recent neutron diffraction studies have shown that in $Cr_2(W,Te)O_6$ systems, which consist of bilayers with strong antiferromagnetic inter-bilayer coupling between Cr moments, the intra-bilayer coupling between the Cr moments can be tuned from ferro (for W) to antiferro (for Te). Ab initio density functional calculations provide a microscopic understanding of the magnetic structure but cannot explain the magnitude of the ordered Cr^{3+} moments. In order to understand the reduction of the ordered moment (ROM) caused by quantum spin fluctuations we have studied the magnon dispersion and ROM using a two parameter quantum Heisenberg spin Hamiltonian with tunable intra-(j) and antiferromagnetic inter- (J) bilayer couplings. The magnon dispersion and sublattice magnetization have been calculated using non-linear spin wave theory up to second-order corrections in spin S.

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