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$CaMn_2Sb_2$: Spin Waves Near a Tricritical Point of the Antiferromagnetic Honeycomb Lattice[1] DANIEL MCNALLY, Stony Brook University, JACK SIMONSON, SUNY Farmingdale, JED KISTNER-MORRIS, GREG SMITH, JULIAN HASSINGER, Stony Brook University, LISA DEBEER-SCHMIDT, ALEXANDER KOLESNIKOV, Spallation Neutron Source, Oak Ridge National Lab, MEIGAN ARONSON, Stony Brook University — The classical Heisenberg model for a honeycomb lattice of spins predicts at least three tricritical points, where three different long range ordered magnetic phases co-exist, depending on the relative strength of the nearest and next-nearest exchange interactions $J_{1,2}$. We performed inelastic neutron scattering at T = 5 K ¡¡ T_N = 85 K on oriented single crystals of the antiferromagnetic insulator $CaMn_2Sb_2$, where the Mn spins $\mu = 2.8\ \mu_B$/Mn form a corrugated honeycomb lattice. Spin wave excitations were observed up to E $\approx$ 24 meV and these data were fit to the spin wave dispersion expected from the classical Heisenberg model to determine the individual exchange interactions $SJ_1 = 8.22 \pm 0.23$ meV, $SJ_2 = 1.29 \pm 0.09$ meV, $SJ_c = -0.56 \pm 0.04$ meV, where J_c is the exchange interaction between honeycomb planes. The quantum fluctuations resulting from proximity to the tricritical point at $J_2/J_1 = 1/6$ are responsible for the relatively low ordering temperature of $CaMn_2Sb_2$,T_N = 85 K, much reduced from the mean field ordering temperature $T_{MFT} = 2zJ_1S(S+1)/3k_B$ = 560 K.

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