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Elastic and inelastic neutron scattering study on (CuCl)LaTa₂O₇
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NIST CENTER FOR NEUTRON RESEARCH COLLABORATION — A quasi-
two-dimensional frustrated spin system, (CuCl)La(Nb_{1-x}Ta_x)₂O₇, shows a quantum
phase transition upon doping of Ta ions from a singlet state to an ordered state at
 $x \sim 0.4$. (CuCl)LaNb₂O₇ has been reported as the first ferromagnetically coupled
Shastry-Sutherland singlets with the triplet excitations centered at 2 meV. We re-
port elastic and inelastic neutron scattering measurements on a powder sample of
(CuCl)LaTa₂O₇ with and without an magnetic field. Our results show that upon
cooling this system undergoes a magnetic ordering below 7 K with a characteristic
wave vector of $Q = (1/2 \ 0 \ 1/2)$. The magnetic excitations in the ordered phase are
dominated by a nearly dispersionless mode centered at 2 meV similar to the triplet
excitations observed in (CuCl)LaNb₂O₇. Under field, however, the 2 meV mode
in (CuCl)LaTa₂O₇ splits into two modes, clearly indicating that it is a spin wave
expected for an ordered state.

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