

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**The amplitude mode  
in three-dimensional dimerized antiferromagnets<sup>1</sup>** YANQI QIN, Institute of  
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tering and Imaging, Paul Scherrer Institute, ZIYANG MENG, Institute of Physics,  
Chinese Academy of Sciences (CAS) — The amplitude (Higgs) mode is a ubiquitous  
collective excitation related to spontaneous breaking of a continuous symmetry. We  
combine quantum Monte Carlo (QMC) simulations with stochastic analytic contin-  
uation to investigate the dynamics of the amplitude mode in a three-dimensional  
dimerized quantum spin system. We characterize this mode by calculating the spin  
and dimer spectral functions near the quantum critical point, finding that both the  
energies and the intrinsic widths satisfy field-theoretical scaling predictions. While  
the line width of the spin response is close to that observed in neutron scattering  
experiments on  $\text{TlCuCl}_3$ , the dimer response is significantly broader. Our results  
demonstrate that highly non-trivial dynamical properties are accessible by modern  
QMC and analytic continuation methods.

<sup>1</sup>YQQ and ZYM acknowledge support from the Ministry of Science and Technology  
of China under Grant No. 2016YFA0300502, the National Science Foundation of  
China under Grant Nos. 11421092 and 11574359, and the National Thousand-  
Young-Talents Program of China.

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Date submitted: 08 Nov 2016

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