

Abstract Submitted  
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**Spin Rotation Technique for Non-Collinear Magnetic Systems:  
Application to the Generalized Villain Model** J.T. HARALDSEN, R.S. FISH-  
MAN, Oak Ridge National Laboratory — This work develops a new generalized  
technique for determining the static and dynamic properties of any non-collinear  
magnetic system. By rotating the spin operators in the local spin reference frame,  
we evaluate the zeroth, first, and second order terms in a Holstein-Primakoff expan-  
sion, and through a Green's functions approach, we determine the structure factor  
intensities for the spin-wave frequencies. To demonstrate this technique, we examine  
the spin-wave dynamics of the generalized Villain model with a varying interchain  
interaction. The new interchain coupling expands the overall phase diagram with the  
realization of two separate spin configurations. The rotational Holstein-Primakoff  
expansion provides both analytical and numerical results for the spin dynamics and  
intensities of these phases. Research sponsored by the Division of Materials Sciences  
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