

Abstract Submitted  
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**Investigation of a Model for the Magnetic Properties of  $\text{RuSr}_2\text{GdCu}_2\text{O}_8$  based on the Temperature Dependence of Mössbauer Spectra**<sup>1</sup> D. COFFEY, M. DEMARCO, Dept. of Physics, Buffalo State College, NY 14222, B. DABROWSKI, S. KOLESNIK, M. MAXWELL, Dept. of Physics, Northern Illinois University, DeKalb, IL 60115, S. TOORONGIAN, M. HAKA, Nuclear Medicine Department, State University of New York, NY 14260 — Mössbauer spectra were measured from 4.2K to 145K on a <sup>99</sup>Ru enriched sample of  $\text{RuSr}_2\text{GdCu}_2\text{O}_8$  which magnetically orders at 138K and has a full transition to superconductivity at 8.7K with an onset at  $\sim 13$ K. The superconducting transition has no effect on the spectrum which is determined by the hyperfine magnetic field. At low temperatures there is a rapid decrease of this hyperfine magnetic field with increasing temperature indicating a gapless magnon spectrum. We use a local moment model which includes coupling between nearest neighbor in-plane Ru moments and between the Ru moments and Gd moments to calculate the magnon spectrum and use this to estimate the strength of the exchange interactions based on the hyperfine field temperature dependence. The coupling strength is  $\sim 250$ K for Ru-Ru coupling and  $\sim 15$ K for Ru-Gd coupling. We discuss the possible microscopic origin of these coupling strengths.

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