

Abstract Submitted  
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**Heisenberg  $S=1/2$  Spin Ladders: New Molecular-Based Examples** CHRISTOPHER LANDEE, Clark University, A. SHAPIRA, M. TURNBULL, Clark University — Heisenberg spin ladders have a cooperative spin singlet ground state and two critical fields. The ratios of the two fields depend on the ratio of the interaction strengths along the rungs and along the rails of the ladder. Coordination polymers provide examples of spin ladders with exchange strengths small enough to induce critical fields that are less than 60 tesla. To date these molecular-based compounds consist either of lattices of  $\text{CuBr}_4$  dianions packed into ladders by large organic molecules [1,2] or neutral  $\text{Cu}_2\text{X}_4$  dimers ( $\text{X} = \text{Cl}, \text{Br}$ ) linked into ladders by bridging diazine molecules such as quinoxaline [3]. We present the structures and results of magnetic measurements of three new spin ladders,  $(\text{quinolinium})_2\text{CuBr}_4$ ,  $\text{Cu}(\text{methylpyrazine})\text{Cl}_2$ , and  $\text{Cu}(2,3\text{-dimethylpyrazine})\text{Cl}_2$ . The susceptibility of each of the compounds possesses a characteristic rounded maximum near 20 K, with a rapid decrease at lower temperatures. Comparison of the data for  $\text{Cu}(2,3\text{-dimethylpyrazine})\text{Cl}_2$  to a spin ladder model reveals the rung and rail exchange constants to be 29.0 K and 17.2 K, respectively. [1] C. P. Landee et al, *Phys. Rev. B* **63**, R100402 (2001). [2] R. D. Willett et al, *Inorganic Chemistry* **43**, 3804-3811 (2004). [3] C. P. Landee et al, *Polyhedron* **22**, 2325-2329 (2003).

Christopher Landee  
Clark University

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