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Spin excitations in $S = 1/2$ AFM chains with alternating g-tensor and the Dzyaloshinskii-Moriya interaction. S.A. ZVYAGIN, J. WOSNITZA, Dresden High Magnetic Field Laboratory (HLD), Forschungszentrum Rossendorf, 01314 Dresden, Germany, A.K. KOLEZHUK, Physics Dept., Harvard University, Cambridge, MA 02138 , J. KRZYSTEK, National High Magnetic Field Laboratory, Tallahassee, FL 32310, R. FEYERHERM, Hahn-Meitner-Institute (HMI), 14109 Berlin, Germany — The magnetic excitation spectrum of copper pyrimidine dinitrate (Cu-PM), an $S = 1/2$ antiferromagnetic chain system with alternating g-tensor and the Dzyaloshinskii-Moriya interaction, is probed using ESR spectroscopy in magnetic fields up to 25 T. The field-induced gap is measured *directly*. Signatures of a soliton and three breather branches are identified, and their frequency-field dependences are described in frame of the quantum field sine-Gordon model. Furthermore, the ESR linewidth and shift behavior in Cu-PM in the *perturbative spinon* regime is studied as function of temperature and field. Excellent quantitative agreement between theoretical predictions (Phys. Rev. Lett. 82, 5136 (1999)) and experiment is obtained. The results are published in: S.A. Zvyagin *et al.*, Phys. Rev. Lett. 93, 027201 (2004); *ibid.* 95, 012707 (2005).

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