Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Emergence of helimagnon bands in MnSi[1] MARC JANOSCHEK, Department of Physics, University of California, San Diego, FLORIAN BERNLOCHNER, SARAH DUNSIGER, CHRISTIAN PFLEIDERER, PETER BOENI, Technische Universitaet Muenchen, Germany, BERTRAND ROESSLI, Paul Scherrer Institut, Switzerland, PETER LINK, FRM-II, Technische Universitaet Muenchen, Germany, ACHIM ROSCH, Universitaet zu Koeln, Germany — Recent theoretical studies predict that the broken inversion symmetry in the helical phase of MnSi will lead to a rich spectrum of helimagnons for wave vectors that are small compared to the helical propagation vector $\vec{k}$. Our extensive inelastic neutron scattering study in the helical phase shows the existence of broad dispersive excitations. Using a parameter free model we quantitatively establish that these excitations represent broad spin wave bands that are purely caused by the tiny magnetic propagation vector. The small magnetic Brillouin zone leads to multiple Umklapp interactions and thus many helimagnon modes. Our study provides a tractable show-case how collective spin excitations may be radically modified even in simple systems by seemingly harmless small magnetic propagation vectors.

[1]This work was supported by the NSF (Grant No. PHY05-51164) and by the SFB 608 of the DFG.

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Date submitted: 17 Dec 2009 Electronic form version 1.4