Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Disorder-induced Revival of the Bose-Einstein Condensation at High Magnetic Fields in $Ni(Cl_{1-x}Br_x)_2$-4SC$(NH_2)_2$[1] NICOLAS LAFLORENCIE, MAXIME DUPONT, SYLVAIN CAPPONI, LPT, CNRS, Toulouse — Building on recent NMR experiments [arXiv:1607.02360], we theoretically investigate the high magnetic field regime of the disordered quasi-one-dimensional $S = 1$ antiferromagnetic material $Ni(Cl_{1-x}Br_x)_2$-4SC$(NH_2)_2$. The interplay between disorder, chemically controlled by Br-doping, interactions, and the external magnetic field, leads to a very rich phase diagram. Beyond the well-known antiferromagnetically ordered regime, analog of a Bose condensate of magnons, which disappears when $H \geq 12.3$ T, we unveil a resurgence of phase coherence at higher field $H \sim 13.6$ T, induced by the doping. Interchain couplings stabilize finite temperature long-range order whose extension in the field – temperature space is governed by the concentration of impurities x. Such a "mini-condensation" contrasts with previously reported Bose-glass physics in the same regime by Yu *et al.* [Nature 489, 379 (2012)], and should be accessible to future experiments.

[1]Work supported by the French ANR program BOLODISS and by Region Midi-Pyrenees.

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Date submitted: 09 Nov 2016 Electronic form version 1.4