Finite size effects in the honeycomb lattice compound $InCu_{2/3}V_{1/3}O_3$

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We report the results of high field electron spin resonance, nuclear magnetic resonance and magnetization studies addressing the ground state of the quasi two-dimensional spin-1/2 honeycomb lattice compound $InCu_{2/3}V_{1/3}O_3$. Uncorrelated finite size structural domains occurring in the honeycomb planes are expected to inhibit long range magnetic order. Surprisingly, magnetic resonanse data show the development of two collinear antiferromagnetic (AFM) sublattices below 20K and the presence of the staggered internal field. Magnetization data evidence a spin reorientation transition at 5.7T. Quantum Monte-Carlo calculations show that switching on the coupling between the honeycomb spin planes in a finite size cluster yields a Neel-like AFM spin structure with a substantial staggered magnetization at finite temperatures. [see, A. Yehia, *et al.*, Phys. Rev. B **81**, 060414 (2010)]