The 15th Condensed Matter Physics Seminar of the 2015/2016 Series

will be presented in the James Fletcher Building (JFB), room 334 on Thursday, January 12, 2016 at 4pm by

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Frustration-driven multi-magnon condensates

Much of the research in frustrated quantum magnets has focused on the elusive quest for magnetically disordered phases with highly entangled ground states - quantum spin liquids. Somewhat intermediate between these rare states and commonplace magnets are moderately exotic phases of antiferromagnets in strong magnetic fields which exhibit no dipolar magnetic order transverse to the field, contrary to typical spin-flop antiferromagnetic states.

I describe excitation spectra and dynamical response functions of two such phases - collinear spin-density wave and spin nematic. Both of these unusual phases are characterized by the presence of a gap for excitations with spin one, but differ qualitatively in details of low-energy longitudinal (density like) response.

I explain high relevance of these two phases to the generic case of frustrated ferromagnets in the vicinity of a "quantum Lifshitz point", at which the ferromagnetic state develops a spin wave instability. I then present a novel non-linear sigma model approach to this system and show that all of its properties are controlled by a single dimensionless parameter of the theory.