

"HYSTERETIC FEATURES AT QUANTUM HALL BREAKDOWN IN INGAAS/INP QUANTUM WELL HETERO-STRUCTURES - A SIGN OF NUCLEAR SPIN POLARIZATION?"

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at Prof. Hirayama's lab
as an AIMR visiting professor



Time : 4:30pm-5:30pm, November 25, 2016

**Venue: 11th Floor, Engineering Laboratory Complex Building,
Aobayama Campus, Tohoku University**

TITLE: Hysteretic features at quantum Hall breakdown in InGaAs/InP quantum well hetero-structures- a sign of nuclear spin polarization?

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ABSTRACT: Recently Kawamura *et al.* [1,2] reported hysteresis as a signature of dynamic nuclear polarization (DNP) via the hyperfine interaction induced by quantum Hall breakdown for GaAs/Al_{0.3}Ga_{0.7}As hetero-structures at odd-filling factor. Here we report on the characteristics of hysteresis seen at odd-filling factor quantum Hall breakdown for an InGaAs/InP quantum well. We examine if the hysteresis observed is consistent with a picture of DNP, or if it has its origin elsewhere, for example, arising from quantum Hall ferromagnetism as argued by Nachtwei *et al.* [3]. Exploiting their enhanced spin-related properties, indium-based semiconductor quantum wells are of interest for spintronic applications.

[1] M. Kawamura *et al.*, Appl. Phys. Lett. 90, 022102 (2007).

[2] M. Kawamura *et al.*, Phys. Rev. B 83, 041305 (2011).

[3] G. Nachtwei *et al.*, Phys. Rev. B 63, 045306 (2000).

SHORT BIOGRAPHY:

DGA is from the UK, and gained a M.Sc. in Semiconductor Science and Technology from Imperial College in London in 1989 and completed his Ph.D. degree in Science (Physics) from Oxford University in 1992. He then moved to the NTT Basic Research Labs in Japan. First as a postoc, and then as full time researcher, he worked on artificial-atom quantum-dot transistors in the groups of Professor Tarucha (now at RIKEN) and Professor Hirayama (now at Tohoku University). In 2002, he moved to the National Research Council of Canada in Ottawa. He is currently a senior research officer with current interests in quantum dots for quantum information and spintronic applications, and the fundamental physics of low dimensional semiconductor structures.