756th ASRC Seminar/J-PARC MLF Seminar

Date: July 29 (Mon), 13:30~14:30

Location: 4F meeting room at J-PARC Research Bldg.

Speaker: Prof. Seunghun Lee

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Title: Scaling of memories and crossovers in glassy magnets

Abstract:

Aging and memory effects have been key features of glassy systems due to the intrinsic slow dynamics.[1-4] The thermo-remanent magnetization (TRM) method is the most effective way so far to investigate these effects. Recently, Lee and his colleagues have performed the thermo-remanent magnetization (TRM) measurements on several magnetic glassy materials, including magnetic alloys, frustrated magnets, high temperature superconductor-related materials, and Kitaev-related spin-orbit Mott insulators.[1,2] Their TRM results show that scaling of magnetic memories with time can be used to classify magnetic glassy materials into two distinct classes.[1,2] Most densely populated magnets exhibit similar memory behavior characterized by a relaxation exponent of $1-n \approx 0.6(1)$. This exponent is different from $1-n \approx 1/3$ of dilute magnetic alloys that was ascribed to their hierarchical and fractal energy landscape, and is also different from $1-n = 1$ of the conventional Debye relaxation expected for a spin solid, a state with long range order.[1] Furthermore, their systematic study on dilute magnetic alloys with varying magnetic concentration exhibits crossovers among the two glassy states and spin solid.[1]

References

[1] A. M. Samarakoon et al., Scientific Reports 7, 12053 (2017).

[2] A. Samarakoon et al., PNAS 113, 11806-11810 (2016).

[3] J. Yang et al., PNAS 112, 11519-11523 (2015).

[4] I. Klich, S.-H. Lee, K. Iida, Nature Comm. 5, 3497 (2014).

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