

第4回 ナノスピントロニクス・磁性材料科学セミナー

日時: 2023年6月20日(火) 10:30-12:00 名古屋大学工学部5号館2階 523講義室

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「Skyrmions in Spin-Orbitronics and Orbitronics

– novel science and applications in memory & non-conventional computing」

Novel spintronic devices can play a role in the quest for GreenIT if they are stable and can transport and manipulate spin with low power. Devices have been proposed, where switching by energy-efficient approaches is used to manipulate topological spin structures [1,2]. We combine ultimate stability of topological states due to chiral interactions [3,4] with ultra-efficient manipulation using novel spin torques [3-5]. In particular, orbital torques [6] increase the switching efficiency by more than a factor 10. We use skyrmion dynamics for non-conventional stochastic computing applications, where we developed skyrmion reshuffler devices [7] based on skyrmion diffusion, which also reveals the origin of skyrmion pinning [7]. Such diffusion can furthermore be used for Token-based Brownian Computing and Reservoir Computing [8].

References

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- [5] K. Litzius et al., *Nature Electron.*, **3**, 30 (2020).
- [6] S. Ding et al. *Phys. Rev. Lett.*, **125**, 177201, (2020);
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- [8] K. Raab et al., *Nature Commun.*, **13** 6982 (2022);
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