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(G*) POS-G71 – Hidden diffusion and perpetual motion of the skyrmions

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Since the magnetic skyrmion is a topologically protected particle-like domain in the ferromagnetic film, it can survive under thermal agitations and shows Brownian motion. The skyrmion system can be an ideal platform to design unconventional computers like stochastic/Brownian computers. Therefore, investigation of the Brownian motion of the magnetic skyrmion is now the subject of scientific and technical interest [1,2]. In this talk, experimental proof of a non-vanishing x-velocity to y-coordinate correlation will be shown. The result is explained by the Thiele equation including a stochastic field [3,4]. Description of the phenomena introduces the gyro-diffusion constant [5] that is special for the diffusion of the chiral particles like skyrmions. The existence of the x-velocity to y-coordinate correlation also evidences the perpetual rotation motion of the skyrmion. Theory shows that the result does not conflict with the 2nd law of thermodynamics and the van Leeuwen theorem.

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Author: Mr MIKI, Soma (Osaka University)

Co-authors: Prof. SUZUKI, Yoshishige (Osaka University); Prof. TAMURA, Eiiti (Osaka University); Dr GOTO, Minori (Osaka University); Dr ISHIKAWA, Ryo (ULVAC-Osaka University Joint Research Laboratory for Future Technology); Mr TANAKA, Yuji (Osaka University); Mr ABE, Shota (Osaka University); Dr NOMURA, Hikaru (Osaka University)

Presenter: Mr MIKI, Soma (Osaka University)

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