

# 「フロンティア機能性物質創製センター」 オープンセミナーのご案内

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「フロンティア機能性物質創製センター」では、オープンセミナーを開催しております。第28回は、スイス連邦工科大ローザンヌ校・F.Mila 教授にご講演をお願いしました。多くの方々のご来聴をお待ちしています。

兵庫県立大学「フロンティア機能性物質創製センター」  
オープンセミナー(第28回)

**講師 : Frederic Mila 教授**  
(Ecole Polytechnique Federale de Lausanne)

**“Majorana edge states and level crossings in chains of Co adatoms”**

Motivated by recent STM experiments on chains of Co adatoms deposited on Cu<sub>2</sub>N that have revealed a series of ground state level crossings as a function of magnetic field [1], and by their possible connection to Majorana edge states [2], I will discuss the origin of level crossings in the transverse field Ising model perturbed by an additional spin-spin interaction parallel or perpendicular to the magnetic field. I will show that, in a chain of N spins, an additional spin-spin interaction induces N level crossings in the ground state however small it might be, provided it has the same sign as the main interaction [3]. The proof relies on a mapping on Kitaev's 1D model of a p-wave superconductor for which it can be shown that similar level crossings occur provided the pairing amplitude is smaller than the hopping integral due to the oscillating character of the Majorana edge states. Implications for other one-dimensional topological phases such as the Haldane phase of the spin-1 chain will be discussed [4].

[1] R. Toskovic, R. van den Berg, A. Spinelli, I. S. Eliens, B. van den Toorn, B. Bryant, J.-S. Caux, and A. F. Otte, Nat. Phys. 12, 656 (2016).

[2] F. Mila, Nat. Phys. 12, 633 (2016).

[3] G. Vionnet, B. Kumar, F. Mila, Phys. Rev. B 95, 174404 (2017).

[4] N. Chepiga and F. Mila, Phys. Rev. B 96, 060409(R) (2017).

**日時 : 2017 年 11 月 13 日(月曜日)**

**15:30 ~ 16:30**

**場所 : SPring-8 「萌光館」**