

凝縮系物理学ゼミナール

Condensed Matter Seminar

Location: **Room 413**, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: **13:30-15:00**, Wednesday, 27 November 2019

“Half-Quantum Vortex Pair in Polar-Distorted B Phase of Superfluid ^3He ”

Speaker:

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Abstract:

Recently, the novel superfluid phase, the polar pairing state [1], has been discovered in liquid ^3He in nematic aerogels [2]. One aspect of the polar state attracting interests is that the rare topological defect, the half-quantum vortex (HQV), is stable there [3]. Stability of HQVs in the polar phase has been explained theoretically by Nagamura [4]. Subsequently, the HQVs have also been detected in the polar-distorted B phase lying at lower temperatures in the nematic aerogels [5]. This is a surprising event because an isolated HQV is topologically prohibited. In the present work, we have numerically studied to what extent the HQVs may be realized as stable topological defects in the polar-distorted B phase.

References:

- [1] K. Aoyama and R. Ikeda, Phys. Rev. B **73**, 060504(R) (2006).
- [2] V. Dmitriev *et al.*, Phys. Rev. Lett. **115**, 165304 (2015).
- [3] S. Autti *et al.*, Phys. Rev. Lett. **117**, 255301 (2016).
- [4] N. Nagamura and R. Ikeda, Phys. Rev. B **98**, 094524 (2018).
- [5] J. Makinen *et al.*, Nature Communications **10**, 237 (2019).