April 2, 2024

Selected Publications of Hiroshi Fukuyama

Cryogenics

(materials, measurement techniques, mK temperature scale, sub-mK refrigerator)

[1] "Superconducting zinc heat switch for continuous nuclear demagnetization refrigerator and sub-mK experiments", R. Toda, S. Takimoto, Y. Uematsu, S. Murakawa, and H. Fukuyama, arXiv:2209.08260.

[2] "A Simple Experimental Setup for Simultaneous Superfluid-Response and Heat-Capacity Measurements for Helium in Confined Geometries", J. Usami, R. Toda, S. Nakamura, T. Matsui, and H. Fukuyama, J. Low Temp. Phys. **208**, 457 (2022).

[3] "Superconducting Niobium Calorimeter for Studies of Adsorbed Helium Monolayers", J. Usami, K. Tokeshi, T. Matsui, H. Fukuyama, J. Low Temp. Phys. **203**, 1 (2021).

[4] "Performances of a Compact Shielded Superconducting Magnet for Continuous Nuclear Demagnetization Refrigerator", S. Takimoto, R. Toda, S. Murakawa, and H. Fukuyama, J. Low Temp. Phys. **201**, 179 (2020).

[5] "The Role of Substrate Roughness in Superfluid Film Flow Velocity", J. Usami, N. Kato, T. Matsui, and H. Fukuyama, J. Low Temp. Phys. **196**, 52 (2019).

[6] "Characterization of Pyrolytic Graphite Sheet: A New Type of Adsorption Substrate for Studies of Superfluid Thin Films", S. Nakamura, D. Miyafuji, R. Toda, T. Matsui, and H. Fukuyama, J. Low Temp. Phys. **192**, 330 (2018).

[7] "Specific heat, thermal conductivity, and magnetic susceptibility of cyanate ester resins – An alternative to commonly used epoxy resins", S. Nakamura, T. Fujii, S. Matsukawa, M. Katagiri, and H. Fukuyama, Cryogenics **95**, 76 (2018).

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[9] "Low temperature transport properties of pyrolytic graphite sheet", S. Nakamura, D. Miyafuji, T. Fujii, T. Matsui, and H. Fukuyama, Cryogenics **86**, 118 (2017).

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[11] "The boiling suppression of liquid nitrogen", S. Takayoshi, W. Kokuyama, and H. Fukuyama, Cryogenics **49**, 221 (2009).

[12] "A millikelvin temperature scale in high magnetic fields based on ^{3}He melting pressure", Hiroshi Fukuyama, K. Yawata, D. Ito, H. Ikegami, and H. Ishimoto, Physica B **329-333**, 1560 (2003).

[13] "Characterization of ZYX graphite for studies of monolayer ^{3}He below 1 mK", Y. Niimi, S. Murakawa, Y. Matsumoto, K. Honkura, H. Kambara, and H. Fukuyama, Rev. Sci. Instrum. **74**, 4448 (2003).

[14] "Experimental apparatus for heat capacity measurements of 2D ^{3}He in magnetic fields", Y. Matsumoto, S. Murakawa, K. Honkura, C. Bäuerle, H. Kambara, and H. Fukuyama, Physica B **329-333**, 146 (2003).

[15] "Electrical Resistance of Screw-fastened Thermal Joints for Ultra-low Temperatures", T. Okamoto, H. Fukuyama, H. Ishimoto, and S. Ogawa, Rev. Sci. Instrum. **61**, 1332 (1990).

[16] "^{3}He Melting Curve below 15 mK", H. Fukuyama, H. Ishimoto, T. Tazaki, and S. Ogawa, Phys. Rev. B**36**, 8921 (1987).

[17] “Application of a Microcomputer in a Nuclear Refrigeration System with Temperature Control”, A. Sawada, T. Mamiya, H. Fukuyama, and Y. Masuda, Cryogenics **22**, 354 (1982).

Advanced experimental techniques for low-temperature surface science
(ultra-low temperature STM/STS, synchrotron radiation X-ray diffraction)

[18] “Simulations of Surface X-ray Diffraction from a Monolayer ^{4}He Film Adsorbed on Graphite”, A. Kumashita, H. Tajiri, A. Yamaguchi, J. Usami, A. Sumiyama, Y. Yamane, M. Suzuki, T. Minoguchi, Y. Sakurai, and H. Fukuyama, JPS Conf. Proc. **38**, 011004 (2023).

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Novel quantum phases in 2D helium systems
(spin liquid, quantum liquid crystal)

[25] “Possible quantum liquid crystal phases of helium monolayers”, S. Nakamura, K. Matsui, T. Matsui, and H. Fukuyama, Phys. Rev. B **94**, 180501(R) (2016).

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[32] "Nuclear Magnetism in Two-Dimensional Solid Helium Three on Graphite", H. Fukuyama, J. Phys. Soc. Jpn. **77**, 111013 (2008).

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[39] "Magnetization of ^{3}He on Grafoil in the Low-Temperature Limit", P. Schiffer, M.T. O'Keefe, D.D. Osheroff, and H. Fukuyama, Phys. Rev. Lett. **71**, 1403 (1993).

Nuclear magnetic orderings in bulk solid ^{3}He
(ring-exchange interaction)

[40] "Nuclear Magnetic Orderings and Frustration in Bcc ^{3}He in High Magnetic Fields", H. Fukuyama, K. Yawata, T. Momoi, H. Ikegami, H. Ishimoto, arXiv:cond-mat/0505177.

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Superfluid ^{3}He and liquid ^{3}He-^{4}He mixtures

(A-B phase transition, spin-wave, phase separation, and superfluidity in boson-fermion mixtures)

[49] "Isochoric Pressure and ^{3}He Quasiparticle Effective Mass on a ^{3}He-^{4}He Mixture under Pressure", S. Yorozu, H. Fukuyama, and H. Ishimoto, Phys. Rev. **B48**, 9660 (1993).

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2D electronic states in graphite/graphene

(Landau levels, edge state)

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Superconductivity in van der Waals materials

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Patent applications

[68] “ヘリウム回収装置およびヘリウム回収方法”, 福山 寛、大越慎一, 特願 2020-063432（2020 年 4 月 1 日出願）.

[69] “ヘリウムコンテナ”, 福山 寛, 特願: 2021-121403（2021 年 7 月 26 日出願）.