

List of selected publications

Prof. Dr. Faley Michael I.

2025

M. I. Faley, J. V. Vas, P.-H. Lu, and R. E. Dunin-Borkowski, "NanoSQUIDs with proximity effect nanobridge Josephson junctions for future applications in electron microscopy," *IEEE Transactions on Applied Superconductivity*, vol. 35, no. 5, August 2025, Art.no. 1600105. <https://doi.org/10.1109/TASC.2024.3502572>

V A de Oliveira Lima, M I Faley, O Concepción, S Nandi, P Prakash, M H Hamed, E Kentzinger, T Brückel and C Bednarski-Meinke, "Anomalous magnetoresistance around the critical temperature in heterostructures of high- T_c superconducting $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ and ferromagnetic SrRuO_3 with perpendicular magnetic anisotropy," *Physica Scripta*, vol. 100, no. 7, 4 July 2025, Art.no. 075985. <https://doi.org/10.1088/1402-4896/ade7f7>

2024

J. Williams, M. I. Faley, J. V. Vas, P. Lu, R. E. Dunin-Borkowski "TEM Sample Preparation of Lithographically Patterned Permalloy Nanostructures on Silicon Nitride Membrane". *Beilstein Journal of Nanotechnology* 2024, 15, 1–12. <https://doi.org/10.3762/bjnano.15.1>.

Faley M.I. (2024) Nanodimensional superconducting quantum interference devices. In: Chakraborty, Tapash (eds.) *Encyclopedia of Condensed Matter Physics*, 2e, vol. 2, pp. 702-711. Oxford: Elsevier. <https://doi.org/10.1016/B978-0-323-90800-9.00161-X>

M. I. Faley, F. Gunkel, J. Thomsen, A. Tavabi, R. Dittmann, R. E. Dunin-Borkowski, „Method for producing a TEM grid and TEM grid", *Patent pending* EP24193235, priority date 07 August 2024.

M. I. Faley, „Bauelement mit Josephson-Kontakt, Magnetfeldsensor sowie Verfahren zur Herstellung", *Patent pending* DE102024133048, priority date 12. November 2024.

2023

Michael I. Faley, Joshua Williams, Penghan Lu and R. E. Dunin-Borkowski "TiN-NbN-TiN and Permalloy Nanostructures for Applications in Transmission Electron Microscopy". *Electronics*, 12(9), 2144 (14pp) (2023). <https://doi.org/10.3390/electronics12092144>

M. I. Faley, J. Williams, P.-H. Lu and R. E. Dunin-Borkowski, NanoSQUIDs and other nanostructures of quantum materials for operation in TEM". Invited Poster at the European Conference on Applied Superconductivity, 3rd-7th September 2023, Bologna, Italy.

2022

M. I. Faley and R. E. Dunin-Borkowski "A Self-Flux-Biased NanoSQUID with Four NbN-TiN-NbN Nanobridge Josephson Junctions" *Electronics* **11** 1704 (12pp) (2022). <https://doi.org/10.3390/electronics11111704>

Faley M I, Fiadziushkin H, Frohn B, Schüffelgen P and Dunin-Borkowski R E 2022 TiN nanobridge Josephson junctions and nanoSQUIDs on SiN-buffered Si, *Superconductor Science and Technology* **35** 065001 (10pp); <https://doi.org/10.1088/1361-6668/ac64cd>

2021

M. I. Faley, T. Bikulov, V. Bosboom, A. A. Golubov, and R. E. Dunin-Borkowski "Bulk nanomachining of cantilevers with Nb nanoSQUIDs based on nanobridge Josephson junctions", *Superconductor Science and Technology* **34** 035014 (8pp) (2021). <https://doi.org/10.1088/1361-6668/abda5c>

M. I. Faley, Y. Liu, and R. E. Dunin-Borkowski “Titanium Nitride as a New Prospective Material for NanoSQUIDs and Superconducting Nanobridge Electronics” *Nanomaterials* **11**, 466 (12pp) (2021).
<https://doi.org/10.3390/nano11020466>

2020

M. I. Faley, P. Reith, C. D. Satrya, V. S. Stolyarov, B. Folkers, A. A. Golubov, H. Hilgenkamp, and R. E. Dunin-Borkowski “**MoRe/YBa₂Cu₃O_{7-x} Josephson junctions and π -loops**”, *Superconductor Science and Technology* **33** 044005 (12pp) (2020). <https://doi.org/10.1088/1361-6668/ab7053>.

R. Rodrigo, M. I. Faley and R. E. Dunin-Borkowski, “**NanoSQUIDs based on Nb nanobridges**”, *Journal of Physics: Conference Series* **1559** 012011 (2020). <https://doi.org/10.1088/1742-6596/1559/1/012011>

A. G. Shishkin, , O. V. Skryabina, V. L. Gurtovoi, S. E. Dizhur, M. I. Faley, A. A. Golubov and V. S. Stolyarov “**The planar MoRe-based dc nanoSQUID**”, *Superconductor Science and Technology*, **33** 065005 (2020)
<https://doi.org/10.1088/1361-6668/ab877c>

Shao-Bo Mi, Tian Yao, Shao-Dong Cheng, Micheal I. Faley, Ulrich Poppe, Lu Lu, Dawei Wang, and Chun-Lin Jia, “Atomic-scale imaging of interfacial polarization in cuprate-titanate heterostructures”, *Appl. Phys. Lett.* **116**, 251603 (2020); <https://doi.org/10.1063/5.0011081>

2019

M.I.Faley, P.Reith, V.S.Stolyarov, I.A.Golovchanskiy, A.A.Golubov, H.Hilgenkamp, and R.E.Dunin-Borkowski, “ **π -Loops with ds Josephson Junctions**”
IEEE Transactions on Appl. Supercond., vol. 29, no. 5, August 2019, Art. no.1100405.
<https://doi.org/10.1109/TASC.2019.2892078>.

2018

M. I. Faley, Y. V. Maslennikov, V. P. Koshelets, and R. E. Dunin-Borkowski, “**Flip-Chip High-T_c DC SQUID Magnetometer With a Ferromagnetic Flux Antenna**”
IEEE Transactions on Appl. Supercond., **28**, No.4, 1600505 (2018).

M.I.Faley, E.A.Kostyurina, K.V.Kalashnikov, Yu.V.Maslennikov, V.P.Koshelets, and R.E.Dunin-Borkowski, “**Superconducting Quantum Interferometers for Nondestructive Evaluation**”, Chapter in book “**Intelligent Sensing Technologies for Nondestructive Evaluation**”, ISBN 978-3-03842-877-0 (Pbk); ISBN 978-3-03842-878-7 (PDF), Edited by Seunghee Park, Aimé Lay-Ekuakille, Octavian Postolache and Pedro Silva Girão; Basel, Switzerland; MDPI Books; pp. 192-207 (2018).
<https://doi.org/10.3390/books978-3-03842-878-7>

2017

Faley M.I., Kostyurina E.A., Kalashnikov K.V., Maslennikov Yu.V., Koshelets V.P., Dunin-Borkowski R.E. “**Superconducting Quantum Interferometers for Nondestructive Evaluation**”
Sensors, **17**, 2798 (2017). doi:10.3390/s17122798

M. I. Faley, J. Dammers, Y. V. Maslennikov, J. F. Schneiderman, D. Winkler, V. P. Koshelets, N. J. Shah, and R. E. Dunin-Borkowski, “**High-T_c SQUID biomagnetometers**”
Superconductor Science and Technology, **30**, 083001 (2017).

M. I. Faley, E. A. Kostyurina, P. Diehle, U. Poppe, A. Kovacs, Yu. V. Maslennikov, V. P. Koshelets and R. E. Dunin-Borkowski, “Nondestructive Evaluation Using a High-T_c SQUID Microscope”, *IEEE Transactions on Appl. Supercond.*, **27**, No.4, 1600905 (2017).

2016

M. I. Faley, V. Yu. Slobodchikov, Yu. V. Maslennikov, V. P. Koshelets and R. E. Dunin-Borkowski, "High- T_c Dual-SQUIDS With Graphoepitaxial Step-Edge Junctions", *IEEE Transactions on Appl. Supercond.*, **26**, No.3, 1600404 (2016).

U. Poppe, D. Weber, Y. Divin, M. Faley, Patent "Ionically controlled three-gate component", CN102959750 (B), granted 30.03.2016.

M. I. Faley and U. Poppe, Patent "Sputterquellen für Hochdruckspattern mit großen Targets und Sputterverfahren", JP5934227 granted 16.06.2016 and EP2630650 granted 28.09.2016.

M. I. Faley, U. Poppe and R. L. Fagaly "Electrical resistance elements and measuring system for measuring time-variable magnetic fields or field gradients", Patent US9476950B2 granted 25.10.2016.

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M. I. Faley, I. A. Gerasimov, O. M. Faley, H. Chocholacs, J. Dammers, E. Eich, F. Boers, N. J. Shah, A.S.Sobolev, V. Yu. Slobodchikov, Yu. V. Maslennikov, V. P. Koshelets and R. E. Dunin-Borkowski, "Integration issues of graphoepitaxial high- T_c SQUIDS into multichannel MEG systems". *IEEE Transactions on Applied Superconductivity*, **25**, No.3, 1601605 (2015) DOI: 10.1109/TASC.2014.2365098.

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M. I. Faley, O. M. Faley, U. Poppe, U. Klemradt, R. E. Dunin-Borkowski, "New prospective applications of heterostructures with $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ ". Chapter in book "Superconductors", ISBN 978-953-51-4163-1, Edited by A. Gabovich, Rijeka: InTech; 2015.

M. I. Faley "Reproduzierbarer Stufen-Josephson-Kontakt für ein Bauelement der supraleitenden Elektronik und Herstellverfahren dafür", Patent DE 102012006825 B4 (granted 26.02.2015).

M. I. Faley, "Reproducible step-edge Josephson junction," Patent US20150069331 (published March 12, 2015) and Patent EP 2834860 B1 (granted 30.12.2015).

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Jürgen Dammers, Harald Chocholacs, Eberhard Eich, Frank Boers, Michael Faley, Rafal E. Dunin-Borkowski and N. Jon Shah, "Source localization of brain activity using helium-free interferometer", *Appl. Phys. Lett.* **104**, 213705 (2014); <http://dx.doi.org/10.1063/1.4880097>

M. I. Faley, D. Meertens, U. Poppe and R. E. Dunin-Borkowski "Graphoepitaxial high- T_c SQUIDS", *Journal of Physics: Conference Series (JPCS)* **507**, 042009 (2014).

M. I. Faley and U. Poppe, "Supraleitender Magnetfeldstabilisator" Patent pending DE102014003536 (2014).

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M. I. Faley "Reproduzierbarer Stufen-Josephson-Kontakt", Patent DE 102012006825 A1 (10.10.2013).

M. I. Faley, D. Meertens, U. Poppe and R. E. Dunin-Borkowski "Graphoepitaxial Josephson junctions and DC SQUIDS", *IEEE Xplore Digital Library*, pp.1-3, (2013). DOI: 10.1109/ISEC.2013.6604264. Print ISBN: 978-1-4673-6369-3. INSPEC Accession Number: 13780234. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6604264>

M. I. Faley, U. Poppe, R. E. Dunin-Borkowski, M. Schiek, F. Boers, H. Chocholacs, J. Dammers, E. Eich, N. J. Shah, A. Ermakov, V. Yu. Slobodchikov, Yu. V. Maslennikov, and V. P. Koshelets, "High- T_c DC SQUIDS for magnetoencephalography", *IEEE Transactions on Applied Superconductivity* **23** Issue 3 part 1 p.1600705(5) (2013).

M. I. Faley, and U. Poppe, „Sputtering sources for high-pressure sputtering with large targets and sputtering method“, Patent US20130199924A1 (08.08.2013), CN 103168338 A (19.06.2013).

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M. I. Faley, U. Poppe, D. Meertens, O. M. Faley, C. L. Jia, R. E. Dunin-Borkowski, "Epitaxy and graphoepitaxy of oxide heterostructures on step edges", In: “*emc2012 Proceedings of the 15th European Microscopy Congress*”, 16th - 21st September 2012, Manchester, UK”, Volume 1: Physical Sciences: Applications, Edited by D.J.Stokes and W.M.Rainforth, © The Royal Microscopical Society, ISBN 978-0-9502463-5-2, pp. 307-308 (2012).

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