



Curriculum Vitae

Name Mr. Bence Gábor Márkus
Born Budapest, 09/17/1991
Nationality Hungarian
Marital status Married
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Studies

- 2015-2020 PhD at Budapest University of Technology and Economics (BME/TU-Budapest), Department of Physics
Thesis: [Spin and Charge Dynamics in Novel Low-Dimensional Materials](#), supervisor: Prof. Dr. Ferenc Simon (TU-Budapest, Department of Physics), qualification of PhD: summa cum laude, day of defense: 10/16/2020
- 2013-2015 Eötvös Loránd University, Budapest, Physicist MSc, solid-state and material physics specialization, qualification of diploma: with honors
Thesis: [Investigation of Electronic Properties of New Carbon Based Materials with Solid State Spectroscopy](#) (in Hungarian), supervisor: Prof. Dr. Ferenc Simon (TU-Budapest, Department of Physics)
- 2010-2013 Eötvös Loránd University, Budapest, Physics BSc, physicist specialization, qualification of diploma: with honors
Thesis: [Electron Transport in Carbon Based Nanomaterials](#) (in Hungarian), supervisor: Prof. Dr. Ferenc Simon (TU-Budapest, Department of Physics)

Employment

- 2021- Postdoctoral Research Fellow, Stavropoulos Center for Complex Quantum Matter, Department of Physics & Astronomy, University of Notre Dame, Notre Dame, 46556 IN, USA
- 2021 Research fellow, Wigner Research Centre for Physics, Budapest, Hungary
- 2020-2021 Research fellow, Budapest University of Technology and Economics, Budapest, Hungary (part time)
- 2013-2020 Assistant research fellow, Budapest University of Technology and Economics, Budapest, Hungary

Publications

Papers

- 1 2023 R. Lózsa, E. Németh, J. Gervai, B. G. Márkus, S. Kollarics, Zs. Gyure, J. Tóth, F. Simon, D. Szüts: **DNA mismatch repair protects the genome from oxygen-induced replicative mutagenesis**, *Nucleic Acid Research* (2023)
- 2 2023 N. Mukesh, B. G. Márkus, N. Jegenyés, G. Bortel, S. M. Bezerra, F. Simon, D. Beke, A. Gali: **Formation of Paramagnetic Defects in the Synthesis of Silicon Carbide**, *Micromachines* **14**(8), 1517 (2023)
- 3 2023 B. G. Márkus, M. Gmitra, B. Dóra, G. Csősz, T. Fehér, P. Szirmai, B. Náfrádi, V. Zólyomi, L. Forró, J. Fabian, F. Simon: **Ultralong 100 ns spin relaxation time in graphite at room temperature**, *Nature Communications* **14**, 2831 (2023)
- 4 2022 A. Bojtor, S. Kollarics, B. G. Márkus, A. Sienkiewicz, M. Kollár, L. Forró, F. Simon: **Ultralong Charge Carrier Recombination Time in Methylammonium Lead Halide Perovskites**, *ACS Photonics* **9**(10), 3341-3350 (2022)
- 5 2022 M. M. Rudolf, G. Bortel, B. G. Márkus, N. Jegenyés, V. Verkhovlyuk, K. Kamarás, F. Simon, A. Gali, D. Beke: **Optimization of Chromium-Doped Zinc Gallate Nanocrystals for Strong Near-Infrared Emission by Annealing**, *ACS Applied Nano Materials* **5**(7), 8950-8961 (2022)
- 6 2022 T. Veres, C. Voniatis, K. Molnár, D. Nesztor, D. Fehér, A. Ferencz, I. Gresits, Gy. Thuróczy, B. G. Márkus, F. Simon, N. M. Nemes, M. García-Hernández, L. Reiniger, I. Horváth, D. Máthé, K. Szigeti, E. Tombácz, A. Jedlovszky-Hajdu: **An Implantable Magneto-Responsive Poly (aspartamide) Based Electrospun Scaffold for Hyperthermia Treatment**, *Nanomaterials* **9**(12), 1476 (2022)
- 7 2022 Zs. Iszály, I. Gresits, I. G. Márián, Gy. Thuróczy, O. Sági, B. G. Márkus, F. Simon, I. Nándori: **Polarised superlocalization in magnetic nanoparticle hyperthermia**, *Journal of Physics D: Applied Physics* **55**, 205001 (2022)
- 8 2022 S. Kollarics, F. Simon, A. Bojtor, K. Koltai, G. Klujber, M. Szieberth, B. G. Márkus, D. Beke, K. Kamarás, A. Gali, D. Amirari, R. Berry, S. Boucher, D. Gavryushkin, G. Jeschke, J. P. Cleveland, S. Takahashi, P. Szirmai, L. Forró, E. Emmanouilidou, R. Singh, K. Holczer: **Ultrahigh nitrogen-vacancy center concentration in diamond**, *Carbon* **188**, 393–400 (2022)
- 9 2021 D. Beke, M. V. Nardi, G. Bortel, M. Timpel, Zs. Czigány, L. Pasquali, A. Chiappini, G. Bais, M. Rudolf, D. Zalka, F. Bigi, F. Rossi, L. Bencs, A. Pekker, B. G. Márkus, G. Salviati, S. E. Sadow, K. Kamarás, F. Simon, A. Gali: **Enhancement of X-ray-Excited Red Luminescence of Chromium-Doped Zinc Gallate via Ultrasmall Silicon Carbide Nanocrystals**, *Chemistry of Materials* **33**(7), 2457–2465 (2021)
- 10 2021 I. Gresits, Gy. Thuróczy, O. Sági, S. Kollarics, G. Csősz, B. G. Márkus, N. M. Nemes, M. García Hernández, F. Simon: **Non-exponential magnetic relaxation in magnetic nanoparticles for hyperthermia**, *Journal of Magnetism and Magnetic Materials* **526**, 167682 (2021)
- 11 2021 A. Mitrović, S. Wild, V. Lloret, M. Fickert, M. Assebban, B. G. Márkus, F. Simon, F. Hauke, G. Abellán, A. Hirsch: **Interface amorphization of two-dimensional black phosphorus upon the treatment with diazonium salts**, *Chemistry - A European Journal* **27**, 3361–3366 (2021)

- 12 2020 J. Gainza, F. Serrano-Sánchez, J. E. F. S. Rodrigues, Y. Huttel, O. J. Dura, M. M. Koza, M. T. Fernández-Díaz, J. J. Meléndez, B. G. Márkus, F. Simon, J. L. Martínez, J. A. Alonso, N. M. Nemes: **High-performance n-type SnSe thermoelectric polycrystal prepared by arc-melting**, *Cell Reports Physical Science* **1**(12), 100263 (2020)
- 13 2020 B. G. Márkus, O. Sági, S. Kollarics, K. F. Edelthammer, A. Hirsch, F. Hauke, P. Szirmai, B. Náfrádi, L. Forró, F. Simon: **Tuning Conductivity and Spin Dynamics in Few-Layer Graphene via In Situ Potassium Exposure**, *Physica Status Solidi B* **257**(12), 2000368 (2020)
- 14 2020 S. Kollarics, A. Bojtor, K. Koltai, B. G. Márkus, K. Holczer, J. Volk, G. Klujber, M. Szieberth, F. Simon: **Optical-Microwave Pump-Probe Studies of Electronic Properties in Novel Materials**, *Physica Status Solidi B* **257**(12), 2000298 (2020)
- 15 2020 B. G. Márkus, P. Szirmai, K. F. Edelthammer, P. Eckerlein, A. Hirsch, F. Hauke, N. M. Nemes, Julio C. Chacón-Torres, B. Náfrádi, L. Forró, T. Pichler, F. Simon: **Ultralong Spin Lifetime in Light Alkali Atom Doped Graphene**, *ACS Nano* **14**(6), 7492–7501 (2020)
- 16 2020 D. Beke, J. Valenta, G. Károlyházy, S. Lenk, Z. Czigany, B. G. Márkus, K. Kamarás, F. Simon, A. Gali: **Room Temperature Defect Qubits in Ultrasmall Nanocrystals**, *The Journal of Physical Chemistry Letters* **11**, 1675–1681 (2020)
- 17 2020 J. A. Carrasco, A. Seijas-Da Silva, V. Oestreicher, J. Romero, B. G. Márkus, F. Simon, B. J. C. Vieira, J. C. Waerenborgh, G. Abellán, E. Coronado: **Fundamental Insights into the Covalent Silane Functionalization of NiFe-Layered Double Hydroxides**, *Chemistry - A European Journal* **26**(29), 6504–6517 (2020)
- 18 2020 M. Tejada-Serrano, V. Lloret, B. G. Márkus, F. Simon, F. Hauke, A. Hirsch, A. Doménech-Carbó, G. Abellán, A. Leyva-Pérez: **Few-layer black phosphorous catalyses radical additions to alkenes faster than low-valence metals**, *ChemCatChem* **12**(8), 2226–2232 (2020)
- 19 2019 P. Szirmai, B. G. Márkus¹, J. C. Chacón-Torres, P. Eckerlein, K. Edelthammer, J. M. Englert, U. Mundloch, A. Hirsch, F. Hauke, B. Náfrádi, L. Forró, C. Kramberger, T. Pichler, F. Simon: **Characterizing the maximum number of layers in chemically exfoliated graphene**, *Scientific Reports* **9**, 19480 (2019)
- 20 2019 S. Kollarics, J. Palotás, A. Bojtor, B. G. Márkus, P. Rohringer, T. Pichler, F. Simon: **Improved laser based photoluminescence on single-walled carbon nanotubes**, *Physica Status Solidi B* **256**(12), 1900235 (2019)
- 21 2019 B. G. Márkus, P. Szirmai, S. Kollarics, B. Náfrádi, L. Forró, J. C. Chacón-Torres, T. Pichler, F. Simon: **Improved alkali intercalation of carbonaceous materials in ammonia solution**, *Physica Status Solidi B* **256**(12), 1900324 (2019)
- 22 2019 F. Márkus, B. G. Márkus: **Enhanced Electron Scattering upon Ion Relocation in BaVS₃ at 69 K**, *Entropy* **21**(8), 813 (2019)
- 23 2019 I. Gresits, Gy. Thuróczy, O. Sági, I. Homolya, G. Bagaméry, D. Gajári, M. Babos, P. Major, B. G. Márkus, F. Simon: **A highly accurate determination of absorbed power during magnetic hyperthermia**, *Journal of Physics D: Applied Physics* **52**(37), 375401 (2019)
- 24 2018 B. G. Márkus, B. Gyüre-Garami, O. Sági G. Csósz, A. Karsa, F. Márkus, F. Simon: **Heating Causes Nonlinear Microwave Absorption Anomaly in Single-Walled Carbon Nanotubes**, *Physica Status Solidi B* **255**(12), 1800258 (2018)
- 25 2018 B. G. Márkus, G. Csósz, O. Sági, B. Gyüre-Garami, V. Lloret, S. Wild, G. Abellán, N. M. Nemes, G. Klupp, K. Kamarás, A. Hirsch, F. Hauke, F. Simon: **Electronic Properties of Air-Sensitive Nanomaterials Probed with Microwave Impedance Measurements**, *Physica Status Solidi B* **255**(12), 1800250 (2018)

- 26 2018 B. Gyüre-Garami, O. Sági, B. G. Márkus, F. Simon: **A highly accurate measurement of resonator Q -factor and resonance frequency**, *Review of Scientific Instruments* **89**, 113903 (2018)
- 27 2018 I. Gresits, Gy. Thuróczy, O. Sági, B. Gyüre-Garami, B. G. Márkus, F. Simon: **Non-calorimetric determination of absorbed power during magnetic nanoparticle based hyperthermia**, *Scientific Reports* **8**, 12667 (2018)
- 28 2018 G. Csósz, B. G. Márkus, A. Jánossy, N. M. Nemes, F. Murányi, G. Klupp, K. Kamarás, V. G. Kogan, S. L. Bud'ko, P. C. Canfield, F. Simon: **Giant microwave absorption in fine powders of superconductors**, *Scientific Reports* **8**, 11480 (2018)
- 29 2017 B. G. Márkus, F. Simon, K. Nagy, T. Fehér, S. Wild, G. Abellán, J. C. Chacón-Torres, A. Hirsch, F. Hauke: **Electronic and Magnetic Properties of Black Phosphorus**, *Physica Status Solidi B* **254**(14), 1700232 (2017)
- 30 2017 P. Szirmai, B. G. Márkus¹, B. Dóra, G. Fábián, J. Koltai, V. Zólyomi, J. Kürti, B. Náfrádi, L. Forró, T. Pichler, F. Simon: **Doped carbon nanotubes as a model system of biased graphene**, *Physical Review B*, **96**, 075133 (2017)
- 31 2016 B. G. Márkus, L. Szolnoki, D. Iván, B. Dóra, P. Szirmai, B. Náfrádi, L. Forró, F. Simon: **Anisotropic Elliott–Yafet theory and application to KC_8 potassium intercalated graphite**, *Physica Status Solidi B* **253**(12), 2505–2508 (2016)
- 32 2016 D. Quintavalle, B. G. Márkus, A. Jánossy, F. Simon, G. Klupp, M. A. Győri, K. Kamarás, G. Magnani, D. Pontiroli, and M. Riccò: **Electronic and ionic conductivities in superionic Li_4C_{60}** , *Physical Review B*, **93**, 205103 (2016)
- 33 2016 B. G. Márkus, F. Márkus: **Quantum Particle Motion in Absorbing Harmonic Trap**, *Indian Journal of Physics*, **90**, 4, 441-446 (2016)
- 34 2015 B. G. Márkus, F. Simon, J. C. Chacón-Torres, S. Reich, P. Szirmai, B. Náfrádi, L. Forró, T. Pichler, P. Vecera, F. Hauke, A. Hirsch: **Transport, Magnetic and Vibrational Properties of Chemically Exfoliated Few Layer Graphene**, *Physica Status Solidi B*, **52296** (2015)
- 35 2015 B. Gyüre, B. G. Márkus, B. Bernáth, F. Murányi, F. Simon: **A time domain based method for the accurate measurement of Q -factor and resonance frequency of microwave resonators**, *Review of Scientific Instruments* **86**, 094702 (2015)
- 36 2013 S. Giura, B. G. Márkus, S. H. L. Klapp, M. Schoen: **Isotropic-polar phase transitions in an amphiphilic fluid: Density functional theory versus computer simulations**, *Physical Review E* **87**, 012313 (2013)

¹equal contribution with P. Szirmai

Presentations

- 2023 B. G. Márkus, M. Gmitra, B. Dóra, G. Csósz, T. Fehér, P. Szirmai, B. Náfrádi, V. Zólyomi, L. Forró, J. Fabian, S. Ferenc: Ultralong 100 ns Spin Relaxation Time in Graphite at Room Temperature, *APS March Meeting 2023*, conference poster (5-10 March 2023.)
- 2023 D. Beke, A. Gali, M. Rudolf, B. G. Márkus: Microstructure-Dependent Optical Properties of Doped Spinel Oxide Nanosystems, *APS March Meeting 2023*, conference poster (5-10 March 2023.)
- 2020 B. G. Márkus, P. Szirmai, K. Edelthhammer, P. Eckerlein, A. Hirsch, F. Hauke, N. M. Nemes, J. C. Chacón-Torres, B. Náfrádi, T. Pichler, L. Forró, F. Simon: Ultralong spin lifetime in graphene doped with light alkali metals, *IWEPNM 2020*, conference poster (7-14 March 2020.)
- 2019 B. G. Márkus, M. Gmitra, B. Dóra, G. Csósz, T. Fehér, A. Jánossy, P. Szirmai, B. Náfrádi, L. Forró, V. Zólyomi, J. Fabian, F. Simon: Giant spin-relaxation anisotropy in graphite, *1st Contemporary Condensed Matter Physics Challenges*, oral presentation (9th May 2019.)
- 2019 B. G. Márkus, P. Szirmai, J. C. Chacón-Torres, P. Eckerlein, K. Edelthhammer, J. M. Englert, U. Mundloch, A. Hirsch, F. Hauke, B. Náfrádi, L. Forró, C. Kramberger, T. Pichler, F. Simon: Resolving the number of layers in chemically exfoliated graphene, *IWEPNM 2019*, conference poster (9-16 March 2019.)
- 2018 F. Márkus, B. G. Márkus: On the specific heat of BaVS₃ at 69 K, *MECO43 2018*, conference poster (1-4 May 2018.)
- 2018 B. G. Márkus, O. Sági, B. Gyüre-Garami, A. Garami, B. Dóra, F. Simon, V. Lloret, S. Wild, G. Abellán, A. Hirsch, F. Hauke: Magnetic and electronic properties of alkali-doped black phosphorus probed by NMR, ESR and microwave spectroscopy, *IWEPNM 2018*, conference poster (17-24 March 2018.)
- 2017 B. G. Márkus, F. Márkus: Complex potentials in the description of dissipation, *JETC 2017*, conference poster (21-25 May 2017.)
- 2017 B. G. Márkus, B. Gyüre, A. Garami, B. Dóra, S. Wild, G. Abellán, F. Hauke, A. Hirsch, F. Simon: Electronic properties of pristine and alkali-doped black phosphorus, *IWEPNM 2017*, conference poster (08-15 March 2017.)
- 2016 B. G. Márkus, D. Iván, L. Szolnoki, B. Dóra, P. Szirmai, B. Náfrádi, L. Forró, F. Simon: Anisotropic Spin Relaxation in Graphite Intercalated Compounds, *IWEPNM 2016*, conference poster (13-20 February 2016.)
- 2016 Julio Chacón, Benjamin Hatting, Sebastian Heeg, Bence G. Márkus, Ferenc Simon, Christian Berger, Aravind Vijayaraghavan, Stephanie Reich: Vibrational response of graphene in the highly-doped regime, *IWEPNM 2016*, conference poster (13-20 February 2016.)
- 2015 J. C. Chacón-Torres, B. Hatting, S. Heeg, C. Berger, C. Woods, B. G. Márkus, F. Simon, A. Vijayaraghavan, S. Reich: Optical properties of highly doped graphene, *Graphene Week 2015*, conference poster (22-26 June 2015.)
- 2015 B. G. Márkus, F. Márkus: Quantum Particle Motion in Absorbing Harmonic Trap, *MECO40*, conference poster (23-25 March 2015.)
- 2015 B. G. Márkus, P. Szirmai, J. C. Chacón-Torres, P. Vecera, F. Hauke, A. Hirsch, J. M. Englert, T. Pichler, L. Forró, S. Reich, F. Simon: Synthesis and Electronic Properties of Li-doped Chemically Exfoliated Graphene, *IWEPNM 2015*, conference poster (7-14 March 2015)
- 2014 B. G. Márkus, P. Szirmai, T. Pichler, F. Simon: Lithium doped Single-walled carbon nanotubes, *18th Conference of Czech and Slovak Physicists*, conference poster (16-19 September 2014)

Scientific experiences

2020 October	2 months	Research: EPFL, supervisor: Prof. László Forró
2020 August	1 month	Research: EPFL, supervisor: Prof. László Forró
2018 July	1 month	Research: Max Planck Institute CPFS, supervisor: Dr. Michael Baenitz
2018 January	1 week	Research: Universität Wien, supervisor: Prof. Thomas Pichler
2017 August	1 month	Research: ZMP, FAU Erlangen, supervisor: Dr. Frank Hauke
2016 July	1 month	Research: EPFL, supervisor: Prof. László Forró, Dr. Bálint Náfrádi and Dr. Péter Szirmai
2015 July	1 month	Research: EPFL, supervisor: Prof. László Forró, Dr. Bálint Náfrádi and Dr. Péter Szirmai
2015 March	1 week	Research: Freie Universität Berlin, supervisor: Prof. Stephanie Reich, Dr. Julio Cesar Chacón-Torres
2014 July	1 month	Research: Universität Wien, supervisor: Prof. Thomas Pichler, Dr. Julio Cesar Chacón-Torres
2013 April	1 week	EPFL, CERN, ILL visiting tour
2012 August	2 weeks	Research: Technische Universität Berlin, supervisor: Prof. Martin Schoen
2012 July	1 month	Research: Budapest University of Technology, supervisor: Prof. Ferenc Simon

Languages

	Hungarian:	native
2008	English:	proficient with B2 certificate
2019	German:	conversational with B1 certificate
2010	French:	basic

Teaching

2022-23/2	Concepts of Energy and Environment (partial) (SP23-PHYS-10052-CX-01)
2018-19/1	Experimental Physics III. for Physicists (practice) (TE15AF22)
2017-18/1	Experimental Physics III. for Physicists (practice) (TE15AF22)
2016-17/1	Experimental Physics III. for Physicists (practice) (TE15AF22)
2017-17/1	Physics Laboratory II. for Physicists (TE11AF29)
2015-16/2	Physics Laboratory I. for Physicists (TE11AF28)
2015-16/1	Experimental Physics III. for Physicists (practice) (TE15AF22)
2015-16/1	Physics Laboratory II. for Physicists (TE11AF29)
2014-15/1	Introductory Physics for Electrical Engineers (TE11AX12 – VK2)

Field of interest

Experimental solid state physics, solid state spectroscopy, ESR, NMR, Raman-spectroscopy, investigation of carbon based (doped) nanostructures (graphene, carbon nanotubes, fullerene, graphite), 2D materials, black phosphorus, MX_3 , MPX_3 , TMDCs, and TMTCs.

Dissipative quantum systems, Feynman path integral method, field theory approach, second quantization.

IT knowledge

AviSynth+, C, gnuPlot, \LaTeX , Linux, macOS, Matlab/Octave, Microsoft Office, Origin, Python, Windows, VapourSynth, Wolfram Mathematica

Other expertise

Building and maintaining vacuum systems, handling and maintaining inert gas glove-boxes, building and repairing computers, handling of cryogenic liquids (helium and nitrogen)