

The Spin-spectroscopy Group

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<https://spintronics.physics.bme.hu/>

<https://www.facebook.com/TheSYLOresearchgroup>

Research Topics

Pure/Fundamental Sciences:

- Physics of Qubits**
- Material Sciences**
- Spintronics**

Applied:

- Semiconductors – muPCD (Semilab)**
- Application of magnetism (Robert Bosch)**

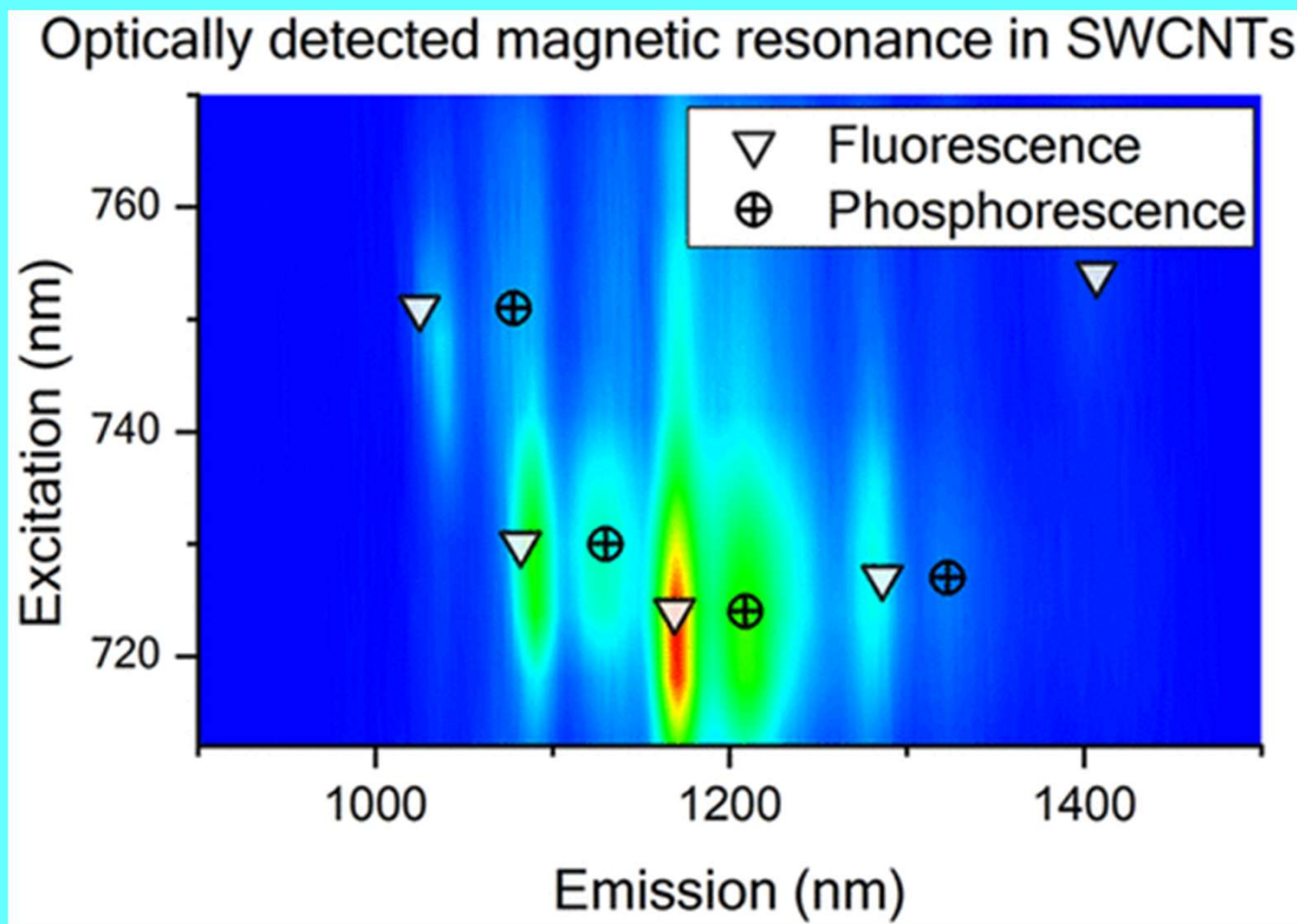
Interdisciplinary

Physics of qubits

J. Palotás et al. ACS Nano (2020).

NV centers in diamond, Kollarics et al. Carbon (2022).

THz generation with diamond, Kollarics et al. Science Advances (2024).



Collaborations:

Uni. Wien

Argonne Nat. Lab.

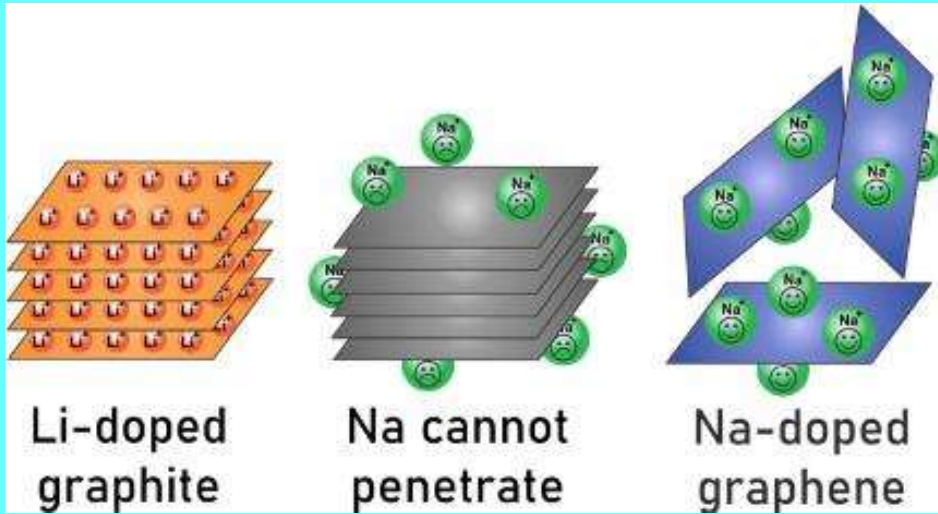
UCLA

Uni. Notre Dame

Wigner FK

Material sciences

Na doped graphene, Ultralong spin lifetime, B. Márkus et al. ACS Nano (2020).



Collaborations:

Uni. Wien

Uni Erlangen

Uni. Madrid

Uni. ND, US

<https://www.kimwan-carbon.com/>

<https://www.pv-magazine.com/>

<https://actu.epfl.ch/>

<https://list.solar/news/graphene-doping/>

Kossuth Rádió 2020-07-23

Graphene doping a step forward for sodium batteries

Scientists at Switzerland's École Polytechnique Fédérale de Lausanne (EPFL) have developed an anode from graphene doped with sodium, which they say could potentially overcome some of the fundamental issues in increasing storage capacity and the lifetime of sodium-ion batteries.

JUNE 19, 2020 MARK HUTCHINS

ENERGY STORAGE

TECHNOLOGY

TECHNOLOGY AND R&D

EUROPE

SWITZERLAND



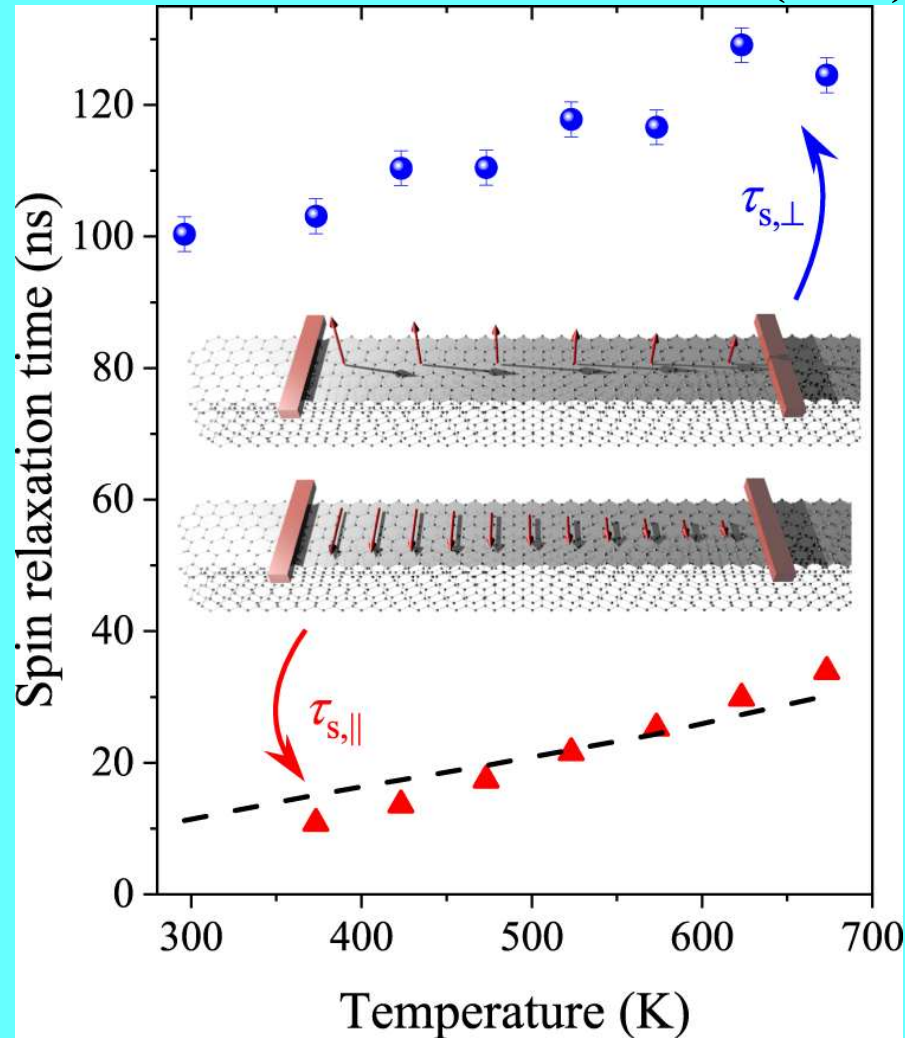
EPFL's campus on the shore's of Lake Geneva.

Spintronics

Ultralong spin lifetime in graphite

Márkus *et al.* Nature Communications (2023).

Márkus *et al.* Adv. Func. Mater. (2025)



Collaborations:
Notre Dame Univ. US
Univ. Regensburg, DE

mu-PCD (Semilab)

Bojtor et al., ACS Photonics (2022).

Bojtor et al., Adv. Erg. & Sust. Res. (2024).

Collaborations:

Semilab

Uni-Madrid

KEP-Techn. (CH)

hvg.hu

2022. augusztus. 11. 08:03 · Utolsó frissítés: 2022. augusztus. 11. 08:58 · TECH

15%-ról 30%-ra is felvihető a napelem
hatásfoka – magyar kutatók léptek előre a
megoldásban



Application of magnetism – high frequencies

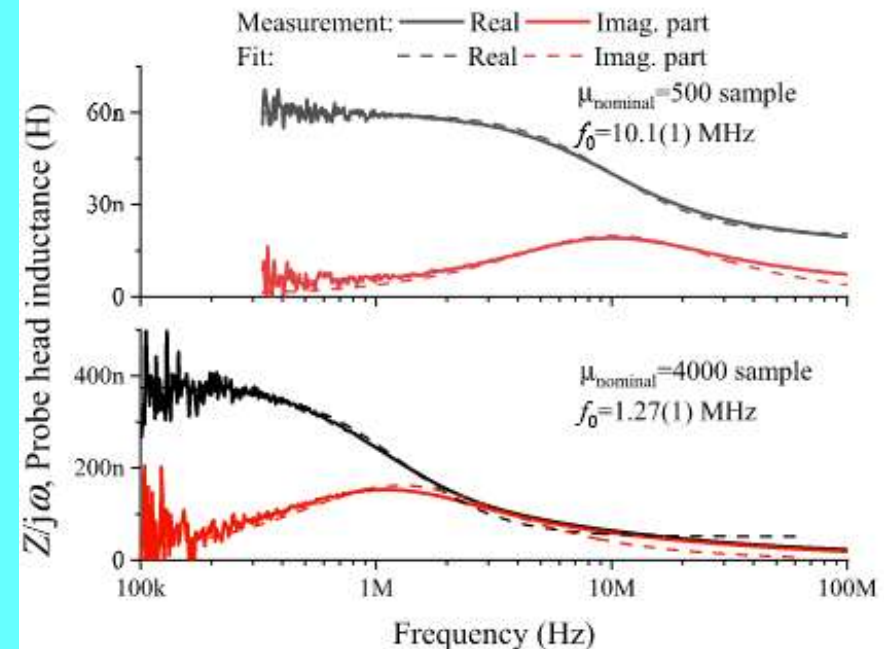
Zámborszky et al. J. Magn. Magn. Mater. (2022)



High-frequency characterization of Fe-based nanocrystalline cores

F. Zámborszky^a, B. Gyüre-Garami^{a, b}, B. Jánosi^a, L. Vajtai^b, L. Hegyessy^b, I. Gresits^b, F. Simon^{b, c}

Collaborations:
Robert Bosch
Magnetec GmbH

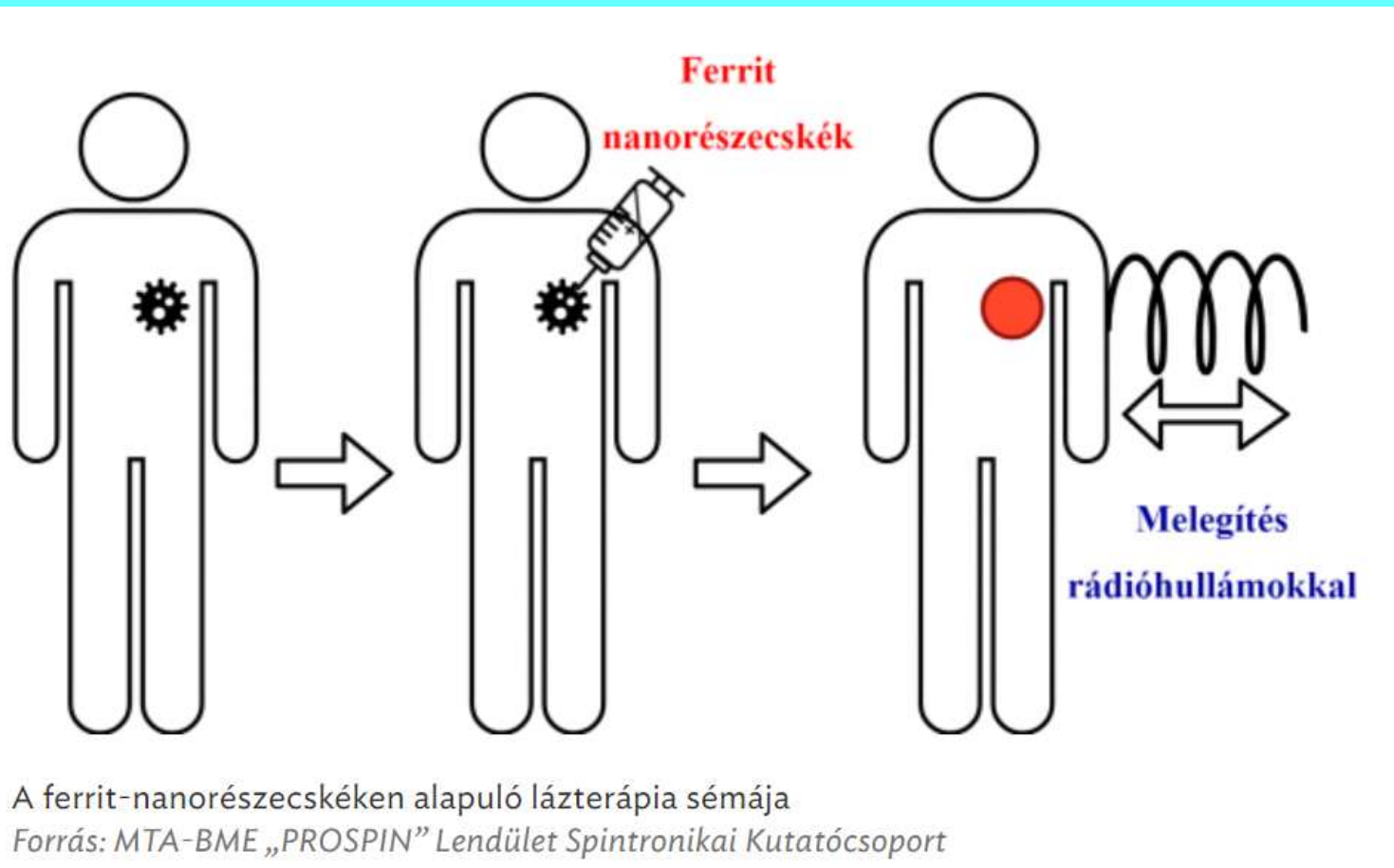


Magnetic hyperthermia (interdisciplinary)

Tumorthrapy with nanomagnetic particles, medical problem, physics approach

Gresits et al. Scientific Reports (2018)

Vajtai et al. Nanomaterials (2024)

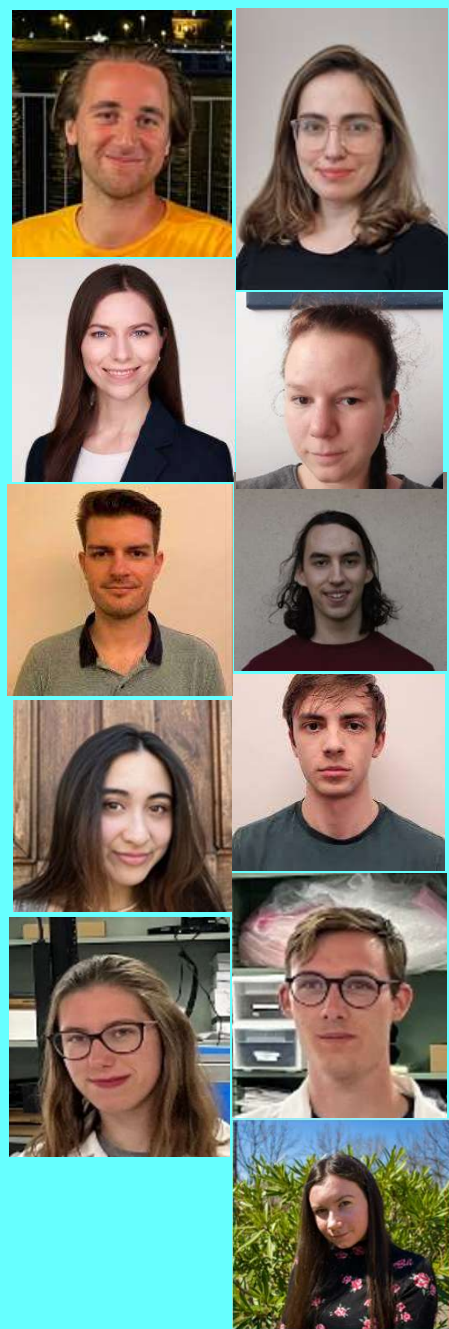


Collaborations:
SE Biofizika
DE theory
Uni. Madrid

TDK/intern



BSc



MSc



PhD



Egyebek

Sikeres diákok
Uni. Notre D

Külföldi tap

Stabil pénzüg
OTKA, MC-E
V4-Japan

#	Name	Host	Date	Duration	Research goals	Partner	Result
1	Fábián Gábor	EPFL, Switzerland	7/1/2009	1 month	ESR in intercalated graphite	Prof. Fomó László	MSc Thesis, PRB article
2	Fábián Gábor	EPM lab, Uni. Wien	7/1/2010	1 month	Raman spectroscopy on SWCNTs, Adaptation of spectrom	Prof. Simon Ferenc, Prof. Thomas Pichler	RSI article, poster, proceedings
3	Szirmai Péter	EPFL, Switzerland	7/1/2011	1 month	ESR in Li doped SWCNTs	Prof. Fomó László	
4	Győre Balázs	EPFL, Lausanne, Switzerland	7/1/2011	1 month	Experience in Q-band ESR techniques	Prof. Fomó László	
5							
6	Szirmai Péter	EPM lab, Uni. Wien	7/1/2012	1 month	Raman spectroscopy in K doped peapods, Macro Raman	Prof. Thomas Pichler, Dr. Christian Kramberger	proceedings, MSc Thesis
7	Dzsaber Szamir	EPM lab, Uni. Wien	7/1/2012	1 month	Development of an FT-Raman spectrometer	Prof. Thomas Pichler, Dr. Christian Kramberger	JRS paper
8	Iván Dávid	EPFL, Lausanne, Switzerland	7/1/2012	1 month	In-situ K doping of few-layer graphene	Prof. Fomó László	
9	Szolnoki László	EPFL, Lausanne, Switzerland	7/1/2012	1 month	In-situ K doping of few-layer graphene	Prof. Fomó László	
10							
11	Szirmai Péter	EPM lab, Uni. Wien	7/1/2013	1 month	In-situ K doping of few-layer graphene	Prof. Thomas Pichler, Dr. Julio Cesar Chacón-Torres	
12	Dzsaber Szamir	EPM lab, Uni. Wien	7/1/2013	1 month	Development of an FT-Raman spectrometer	Prof. Thomas Pichler, Dr. Christian Kramberger	JRS paper
13	Győre Balázs	ITIS/SPEAG, Zürich, Switzerland	7/1/2013	2 months	Improvement of dielectric measurements using open code	Dr. Murányi Ferenc	
14	Szolnoki László	ITIS/SPEAG, Zürich, Switzerland	7/1/2013	2 months	Thermoelectric modelling of the human body	Dr. Murányi Ferenc	
15	Negyedi Milán	Uni Tübingen, DE	7/15/2013	2 months	Rubidium spectroscopy	Prof. Fortágh József	ITN position
16							
17	Iván Dávid	EPFL, Lausanne, Switzerland	7/1/2014	1 month	ESR based MRI	Prof. Fomó László, Dr. Matus Péter	
18	Győre Balázs	ICMM CSIC, Madrid, Spain	7/1/2014	1 month	Implementation of microwaves cavity perturbation measure	Dr. Nemes Norbert	TDK
19	Bernáth Bence	EPFL, Lausanne, Switzerland	7/1/2014	1 month	High frequency ESR spectroscopy on potassium doped gr	Prof. Fomó László	
20	Márkus Bence	EPM lab, Uni. Wien	7/1/2014	1 month	In-situ (Raman) K doping of few-layer graphene, investigat	Prof. Thomas Pichler, Dr. Julio Cesar Chacón-Torres	MSc Thesis, article in preparation, PSSb article
21	Szolnoki László	ITIS/SPEAG, Zürich, Switzerland	7/1/2014	2 months	Thermoelectric modelling of the human body	Dr. Murányi Ferenc	
22	Dzsaber Szamir	ITIS/SPEAG, Zürich, Switzerland	7/1/2014	2 months	Improvement of dielectric measurements using open code	Dr. Murányi Ferenc	
23							
24							
25	Ágner Dorina	CBM CNRS, Orleans, France	7/1/2015	1 month	NMR in biomolecules	Prof. Tóth-Jakab Eva	TDK
26	Békési Anna	EPFL, Switzerland	7/1/2015	1 month	EPR imaging in biological sample	Prof. Fomó László, Dr. Matus Péter	TDK
27	Márkus Bence	EPFL, Switzerland	7/1/2015	1 month	HF-ESR in KCl, ESR in NaLi-FLG	Prof. Fomó László, Dr. Bálint Náfrád, Péter Szirmai	
28	Szolnoki László	ITIS/SPEAG, Zürich, Switzerland	7/1/2015	2 months	Thermoelectric modelling of the human body	Dr. Murányi Ferenc	
29							
30	Márkus Bence	EPFL, Switzerland	7/1/2016	1 month	ESR studies of carbon based materials	Prof. Fomó László, Dr. Bálint Náfrád, Péter Szirmai	
31	Garami Anett	EPFL, Switzerland	7/1/2016	1 month	ESR studies of carbon based materials	Prof. Fomó László, Dr. Bálint Náfrád, Péter Szirmai	
32	Márkus Bence	IWFPM, Kirchberg, Austria	3/1/2016	1 week	poster about alkali doped SWCNTs	conference	
33	Kolarics Sándor	NTIS, Vienna, Austria	6/1/2016	1 week	poster	conference	
34	Márkus Bence	NTIS, Vienna, Austria	6/1/2016	1 week	poster	conference	
35	Polotskiy Julijana	NTIS, Vienna, Austria	6/1/2016	1 week	poster	conference	
36	Okeyatovity Zoltán	ITIS/SPEAG, Zürich, Switzerland	7/1/2016	2 months	Thermoelectric modelling of the human body	Dr. Murányi Ferenc	
37	Csász Gábor	ITIS/SPEAG, Zürich, Switzerland	7/1/2016	2 months	Improvement of dielectric measurements using open code	Dr. Murányi Ferenc	
38	Iván Dávid	CBM CNRS, Orleans, France	7/1/2016	1 month	Developing MRI physics	Prof. Tóth-Jakab Eva	
39	Kolarics Sándor	Uni Tübingen, DE	7/1/2016	1 month	Laser physics developments	Prof. Fortágh József	
40	Polotskiy Julijana	Uni Tübingen, DE	7/1/2016	1 month	Broadband Raman spectroscopy	Prof. Fortágh József	
41							
42	Márkus Bence	Uni Erlangen Nürnberg, DE	7/1/2017	1 month	ESR in functionalized graphene	Dr. Frank Hauke	
43	Márkus Bence	IWFPM, Kirchberg, Austria	3/1/2017	1 week	poster about black phosphorus	conference	
44							
45	Márkus Bence	IWFPM, Kirchberg, Austria	3/1/2018	1 week	poster about black phosphorus	conference	
46	Kolarics Sándor	IWFPM, Kirchberg, Austria	3/1/2018	1 week	poster about CDMR in SWCNTs	conference	
47	Márkus Bence	MPI CPFS Dresden	7/1/2018	1 month	NMR studies of black phosphorus	Dr. Michael Baeritz	
48	Sági Olivér	EPFL, Lausanne, Switzerland	7/1/2018	4 months	high field ESR	Dr. Szirmai Péter, Prof. Fomó László	
49	Bojtor András	Uni Tübingen, DE	7/1/2018	1 month	Laser physics developments	Prof. Fortágh József	
50	Csász Gábor	EPFL, Lausanne, Switzerland	8/1/2018	1 month	EPR-MRI	Dr. Szirmai Péter, Prof. Fomó László	
51	Kolarics Sándor	UCLA, USA	9/1/2018	3 months	time resolved ESR studies	Prof. Károly Holczer	
52							
53	Bojtor András	EPFL, Lausanne, Switzerland	1/1/2019	1 month	PV candidate methylammonia growth and characterization	Dr. Szirmai Péter, Prof. Fomó László	
54	Márkus Bence	IWFPM, Kirchberg, Austria	3/1/2019	1 week	poster about black phosphorus	conference	
55	Bojtor András	EPFL, Lausanne, Switzerland	7/1/2019	1 month	PL candidate methylammonia growth and characterization	Dr. Szirmai Péter, Prof. Fomó László	
56							
57	Kolarics Sándor	IWFPM, Kirchberg, Austria	3/1/2020	1 week	poster about diamond NV	conference	
58	Márkus Bence	IWFPM, Kirchberg, Austria	3/1/2020	1 week	poster about Na doped graphene	conference	
59	Kolarics Sándor	EPFL, Lausanne, Switzerland	8/1/2020	1 month	high field ESR on diamond NV	Prof. Fomó László	
60	Márkus Bence	EPFL, Lausanne, Switzerland	9/1/2020	3 months	high field ESR on diamond NV	Prof. Fomó László	
61							

A csoportélet



A csoportélet

