

# Prof. Dr. PASCAL GEHRING

Institut de la matière condensée et des nanosciences (IMCN)  
Nanosopic Physics (NAPS)

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## RESEARCH EXPERIENCE

**Assistant Professor and Research Associate (FNRS)** from Oct 2020  
**UC Louvain**

- Low-temperature scanning thermal microscopy
- Heterostructures of topological insulators and 2D ferromagnets
- Supervision of PhD and master students

**Postdoctoral Research Assistant** Oct 2019 – Sep 2020  
**Imec / KU Leuven**

- MBE growth of topological insulator thin films
- Device fabrication
- Cryogenic magnetotransport measurements
- Spin orbit torques using topological insulators

**Marie Skłodowska-Curie (IF) Research Fellow** Oct 2017 – Sep 2019  
**Department of Quantum Nanoscience, TU Delft**

- Spintronic and Spin-caloritronic effects in single-molecular magnets
- Graphene-based mechanically controlled break junctions
- Cryogenic transport measurements on high-spin molecules
- Thermoelectric properties of 2D materials

**Senior Research Fellow** Jan 2017 – Sep 2017  
**Department of Materials, University of Oxford**

- Identifying molecular systems suitable for power saving electronics or future thermoelectric materials
- Quantum transport in bottom-up graphene nanoribbons
- Using graphene quantum dot arrays for single-molecule sensing

**Postdoctoral Research Assistant** Oct 2014 – Dec 2016  
**Department of Materials, University of Oxford**

- Study of quantum interference effects in graphene and single-molecular devices
- Scanning photocurrent microscopy measurements on single molecule junctions

**Postdoctoral Research Assistant** Feb 2014 – Oct 2014  
**Max-Planck Institute for Solid State Research, Stuttgart**

- Investigation of black phosphorus and other novel 2D materials suitable for future photovoltaic or sensing applications
- Scanning photo-current microscopy

- Fabrication of photo detectors based on Perovskite/graphene and black phosphorus/graphene or black phosphorus/GaAs heterostructures
- Identifying new topological insulator materials like the mineral Aleksite

**Doctoral Studies (PhD) Mar 2010 – Feb 2014**  
**EPFL, Switzerland and Max-Planck Institute for Solid State Research Stuttgart**

- Doctoral School: Materials Science and Engineering, Nanoscale Science Department, Prof. Dr. K. Kern
- Development of chemical vapour deposition systems to grow 2-dimensional materials
- Study of the low temperature magneto-transport properties of topological insulator thin films
- Characterisation of layered materials using various techniques: atomic force microscopy, scanning electron microscopy, transmission electron microscopy, X-ray photoelectron spectroscopy, angle resolved photoemission spectroscopy
- Device fabrication using electron beam lithography and metallization techniques

**Research assistant Jun 2007 – Sep 2008**  
**Fraunhofer IPA, Stuttgart**

- luminescence properties of abraded particles for clean room technology

## HONORS AND AWARDS

**ERC Starting Grant, European Commission (1.8M€) 2022**  
 Designed to support excellent Principal Investigators at the career stage at which they are starting their own independent research team (success rate 9.8%).

**Chercheur qualifié (CQ) fellowship, FNRS 2020**  
 Permanent research fellowship (Research Associate) which allows a senior researcher to pursue his/her research independently at any university in Wallonia, Belgium.

**David Cockayne Junior Research Fellowship, Linacre College, Oxford 2017**  
 Junior Research Fellowships are highly competitive (success rate < 5%) full-time fellowships offered by the Oxford colleges to exceptional early career researchers. They provide an unrivalled opportunity to establish a research profile as a member of a collegiate community.

**Marie Skłodowska-Curie Individual Fellowship (180k€) 2017**  
 MC-IF (European Commission) are full-time fellowships and are awarded to exceptional early career researchers. These fellowships are among Europe's most competitive and prestigious research and innovation awards (success rate 10-15 %).

**Erster Förderpreis der Willi Dauberschmidt Stiftung (2000€) 2011**  
 I received the 'first prize' of the Willi Dauberschmidt foundation, which honoured my exceptional performance in education.

**Honours Degree (Material Sciences, University of Stuttgart) 2010**  
 The 'Honours Degree' is awarded to the best 5% of each year.

## RESEARCH PROJECTS

<b>ERC-StG</b>	<b>Individual grant</b>	<b>1.8 M€</b>	<b>2022 - 2026</b>
Project: <i>Molecular Quantum Heat Engines</i> (MOUNTAIN).			

<b>EOS</b>	<b>Coordinator</b>	<b>4 M€</b>	<b>2022 - 2026</b>
Project: <i>Caloritronics in magnetic Weyl semimetals</i> (CONNECT).			

<b>FNRS-MIS</b>	<b>Individual grant</b>	<b>300 k€</b>	<b>2022 - 2023</b>
Project: <i>Towards topological devices as components for brain-inspired computing (TopoBrain).</i>			
<b>FNRS-GEQ</b>	<b>Coordinator</b>	<b>500 k€</b>	<b>2022 - 2023</b>
Project: <i>Wafer-scale ultra-precision patterning for high-throughput sensing with semiconductor nanostructures (Attohmics).</i>			
<b>ARC</b>	<b>Principal investigator</b>	<b>1 M€</b>	<b>2022 - 2025</b>
Project: <i>Dynamically Reconfigurable Moiré Materials (DREAMS).</i>			

## FORMAL SUPERVISION

### Post-docs

- Spiece, J. (UCLouvain) Start 2021

### PhD students

- Pirard, J. (UCLouvain) – TBD Start 2022
- Han, S. (UCLouvain) – TBD Start 2022
- Rohde, M. (UCLouvain/KU Leuven) – TBD Start 2022
- Lyu, H. (UCLouvain) – TBD Start 2021
- Huang, Y. (UCLouvain) – TBD Start 2021
- Canetta, A. (UCLouvain) – TBD Start 2021
- Volosheniuk, S. (TU Delft) – TBD Start 2020
- Harzheim, A. (Oxford) – “Thermoelectric effects in carbon nanostructures” 2017-2020

### Master students

- Fonck, V. (UCLouvain) – TBD Start 2021
- Marichal, R. (UCLouvain) – TBD Start 2021
- Meert, M. (imec) – “Towards Topological Spin-Caloritronics” 2020-2021
- Van der Star, M. (Delft) – “Thermoelectric effects in single-molecule junctions” 2018-2019
- Cataldo, E. (Delft). – “Noise measurements of graphene nano-gaps” 2018-2019
- Hermans, M. (Delft) – “Magneto-transport studies of graphene based MCBJs” 2018-2019
- Pathak, G. (MPI) – “Electrical Properties of surface modified Topological Insulators” 2013-2014
- Reusch, F. (MPI) – “Surface oxidation effect on the electrical behaviour of Bi<sub>2</sub>Te<sub>2</sub>Se” 2013-2014

### Summer students

- Fonck, V. (UCLouvain) – “Setting up a table top AFM” 2021
- Dixit, A. (imec) – “Magnetoresistance properties of thin film topological insulators” 2020
- Mishra, A. (Oxford) – “Heat conductance in nanostructures” 2016
- Wald, A. (Oxford) – “The 3-omega method” 2016

## TEACHING EXPERIENCE

**Lecturer and Coordinator (“FAME+ project”)** **2021**

- Coordinator of e-project of Erasmus Mundus joint Master Degree programme

**Lecturer (“Nanoelectronics (LELEC27)”)** **2020, 2021**  
**UC Louvain**

**Organiser and Lecturer (“Molecular Electronics course (BEST Delft)”)** **Apr 2019**

## TU Delft

- Organising a summer school for international students
- Three lectures about molecular electronics
- Preparation of exercises and exams; grading of exercises

## Teaching Assistant (“Mesoscopic Physics”)

Oct 2018 - Jan 2019

### TU Delft

- Gave two lectures about topological insulators and heat transport in nano-scale devices (Postgraduate course in Applied Physics)
- Preparation of exercises and exams; grading of exercises

## Teaching Assistant (“Molecular Electronics”)

Feb - Jun 2018

### TU Delft

- Gave two lectures about thermoelectricity in single molecules and molecular diodes (Postgraduate course in Applied Physics)
- Preparation of exercises and exams

## Classes Teacher (“Materials and Devices for Optics and Optoelectronics”)

2016

### University of Oxford

- Queens College, Mansfield College, Corpus Christi College, St Anne’s College, St Edmund Hall, Trinity College, St Catherine's College

## Tutorial Teacher (“Semiconductor Devices” and “Magnetism”)

2016

### University of Oxford

- Queens College, Mansfield College, Corpus Christi College
- Oxford's core teaching is based around conversations, normally between two or three students and their tutor, who is an expert on that topic. Held weekly for about 20 students.

## Teaching Assistant (“Functional Materials”)

Jul 2013

### University of Stuttgart

- 4 lectures about electronic transport in reduced dimensions (Postgraduate course in Material Sciences)

## Lab course assistant (“Superconductors” and “The Hall-Effect”)

May 2011 - Dec 2013

### University of Stuttgart

- Setting up two new experiments (Superconductors, The Hall-Effect). This included designing the experiments and drafting the preparation script
- Supervising the experiments (3-4 students/group)

## CONFERENCES AND SEMINARS

### Organizer

#### EUROMAT 2021

Sep 2021

#### Virtual Conference & Expo

Symposium organizer: A1 2D Materials: Fundamentals, synthesis and applications

### Contributor

#### Talk: ECMoIS 2022

Apr 2022

#### Dortmund, Germany

“Molecular heat engines”

<b>Talk: Belgian Physical Society Meeting 2021</b> <b>Hasselt, Belgium</b> "Measuring the thermoelectric properties of single molecules"	<b>Dec 2021</b>
<b>Invited Talk: Department Seminar</b> <b>University of Liege</b> "Measuring the thermoelectric properties of single molecules"	<b>Sep 2021</b>
<b>Invited Talk: Next-gen. Chemistry Symposium: Molecular Electronics and Beyond</b> <b>Virtual Symposium, Korea University</b> "Measuring the thermoelectric properties of single molecules"	<b>Sep 2021</b>
<b>Talk: EUROMAT 2021</b> <b>Virtual Conference &amp; Expo</b> "Local Mapping of Thermoelectric Properties of 2D Structures via Scanning Thermal Gate Microscopy"	<b>Sep 2021</b>
<b>Talk: Microscience Microscopy Congress 2021</b> <b>Virtual Conference &amp; Expo</b> "Local Mapping of Thermoelectric Properties of 2D Structures via Scanning Thermal Gate Microscopy"	<b>Jul 2021</b>
<b>Invited Talk: Graphene2020</b> <b>Virtual Conference &amp; Expo</b> "Measuring the local thermoelectric properties of graphene"	<b>Oct 2020</b>
<b>Invited Talk: Materials Challenges for Quantum Technology Engineering &amp; Innovation</b> <b>A*STAR Institute of Materials Research and Engineering, Singapore</b> "Low-dimensional quantum materials for future energy harvesting"	<b>Sep 2020</b>
<b>Invited Departmental seminar talk</b> <b>Queen Mary University of London, UK</b> "Measuring the thermoelectric properties of single molecules and low-dimensional materials"	<b>Jun 2020</b>
<b>Invited Departmental seminar talk</b> <b>ICMOL, Spain</b> "Thermoelectric properties of single molecule junctions"	<b>Nov 2019</b>
<b>Invited Talk: Lauterbad Meeting</b> <b>Lauterbad, Germany</b> "Measuring the thermoelectric properties of single molecules and nano-scale devices"	<b>Oct 2019</b>
<b>Invited Lecture</b> <b>EMPA, Switzerland</b> "Thermoelectric properties of single molecule junctions"	<b>Sep 2019</b>
<b>Talk: Molecular-Scale Thermoelectricity Most-M<sup>3</sup></b> <b>Cambridge, UK</b> "Measuring the gate dependent thermoelectric properties of single molecules"	<b>Sep 2019</b>
<b>Invited Talk: Group seminar</b> <b>imec, Belgium</b> "Electric and thermoelectric characterisation of Dirac materials"	<b>May 2019</b>
<b>Invited Talk: Conference on Modern Concepts and New Materials for Thermoelectricity</b> <b>ICTP, Trieste, Italy</b> "Measuring the thermoelectric properties of graphene nanostructures and single-molecule devices"	<b>Mar 2019</b>

<b>Invited Talk: Group seminar</b> <b>Leiden University, Netherlands</b> "Geometrically Enhanced Thermoelectric Effects in Graphene Nanoconstrictions"	<b>Dec 2018</b>
<b>Invited Talk: Group seminar</b> <b>UC Louvain, Belgium</b> "Electric and thermoelectric properties of graphene based nano-structures and single-molecule devices"	<b>Dec 2018</b>
<b>Talk: Nanoscale and Microscale Heat Transfer VI</b> <b>Levi, Finland</b> "Geometrically Enhanced Thermoelectric Effects in Graphene Nanoconstrictions"	<b>Dec 2018</b>
<b>Invited Talk: Group seminar Solid State Physics and Magnetism</b> <b>KU Leuven, Belgium</b> "Electric and thermoelectric properties of graphene based nano-structures and single-molecule devices"	<b>May 2018</b>
<b>Invited Key-note speaker: MOLESCO Meeting</b> <b>Muggendorf, Germany</b> "Graphene-based electric and thermoelectric nanodevices"	<b>Sep 2017</b>
<b>Talk: Quantum Effects in Electronic Nanodevices (QuEEN) workshop</b> <b>St Anne's College, Oxford, UK</b> "Field-Effect Control of Graphene–Fullerene Thermoelectric Nanodevices"	<b>Dec 2016</b>
<b>ELECMOL</b> <b>Paris, France</b> "Quantum interference in graphene nanoconstrictions" (Poster)	<b>Aug 2016</b>
<b>Experimental Tests of Quantum Reality</b> <b>University of Oxford, UK</b> "Three-terminal graphene single-electron transistor fabricated using feedback-controlled electroburning" (Poster)	<b>Sep 2015</b>
<b>New Trends in Topological Insulators</b> <b>Berlin, Germany</b> "Natural Topological Insulators" (Poster)	<b>Jul 2014</b>
<b>Invited Talk: Group seminar Materials Science</b> <b>University of Stuttgart, Germany</b> "Topological Insulators"	<b>Jun 2013</b>
<b>New Trends in Topological Insulators</b> <b>Sant Feliu de Guixols, Barcelona, Spain</b> "Growth of High-Mobility Bi <sub>2</sub> Te <sub>2</sub> Se Nanoplatelets on hBN Sheets by van der Waals Epitaxy" (Poster)	<b>Jun 2013</b>
<b>Symposium on Quantum Hall Effects and Related Topics</b> <b>MPI Stuttgart, Germany</b> "A Natural Topological Insulator" (Poster)	<b>Jun 2013</b>
<b>Invited Talk: Group seminar</b> <b>Hong Kong University of Science and Technology, Hong Kong</b> "CVD growth of high-quality Topological Insulator materials"	<b>Apr 2013</b>
<b>DPG Conference</b> <b>Regensburg, Germany</b>	<b>Mar 2013</b>

“Growth of High-Mobility Bi<sub>2</sub>Te<sub>2</sub>Se Nanoplatelets on hBN Sheets by van der Waals Epitaxy” (Poster)

## PEER-REVIEWER

Peer-reviewing for various international journals like Nano Letters, Advanced Materials, JACS, ACS Nano, Materials Horizons, ACS Photonics, Applied Physics Letters, Annalen der Physik, Journal of Applied Physics, PSS.Rapids, Journal of Vacuum Science and Technology.

## PUBLICATIONS

30 publications in peer-reviewed journals, 7 as a PI, 14 first-authored, 8 co-authored; **Total citations:** 1065; **h-index:** 18 (as of May 2022, Google Scholar).

1. Hsu, C.; Costi, T. A.; Vogel, D.; Wegeberg, M.; Mayor, M.; van der Zant, H. S. J.; **Gehring, P.** Magnetic-Field Universality of the Kondo Effect Revealed by Thermocurrent Spectroscopy *Physical Review Letters*, **128**, 147701 (2022).
2. Pyurbeeva, E.; Hsu, C.; Vogel, D.; Wegeberg, M.; Mayor, M.; van der Zant, H. S. J.; **Gehring, P.** Controlling the entropy of a single-molecule junction *Nano Letters*, **21**, 9715-9719 (2021).
3. **Gehring, P.**; Sowa, J. K.; Hsu, C.; de Bruijkere, J.; van der Star, M.; Le Roy, J. J.; Bogani, L.; Gauger, E. M. and van der Zant, H. S. J. Complete mapping of the thermoelectric properties of a single molecule *Nature Nanotechnology*, **16**, 426-430 (2021).
4. Harzheim, A.; Evangeli, C.; Kolosov, O.; **Gehring, P.** Direct Mapping of Local Seebeck Coefficient in 2D Material Nanostructures via Scanning Thermal Gate Microscopy *2D Materials*, **7**, 041004 (2020).
5. Harzheim, A.; Koemann, F.; Gotsmann, B.; van der Zant, H. S. J.; **Gehring, P.** Single-Material Graphene Thermocouples *Advanced Functional Materials*, **30**, 2000574 (2020).
6. Caneva, S.; Hermans, M. D.; Lee, M.; García-Fuente, A.; Watanabe, K.; Taniguchi, T.; Dekker, C.; Ferrer, J.; van der Zant, H. S. J.; **Gehring, P.** Mechanically Tunable Quantum Dot in a Graphene Break Junction *Nano Letters*, **20**, 4924-4931 (2020).
7. Harzheim, A.; Sowa, J. K.; Swett, J. L.; Briggs, G. A. D. Briggs; Mol, J. A.; **Gehring, P.** The role of metallic leads and electronic degeneracies in thermoelectric power generation in quantum dots *Physical Review Research* **2**, 013140 (2020).
8. Papadopoulos, N.; **Gehring, P.**; Watanabe, K.; Taniguchi, T.; van der Zant, H. S. J.; Steele, G. A. Tunneling spectroscopy of localized states of WS<sub>2</sub> barriers in vertical van der Waals heterostructures *Physical Review B* **101**, 165303 (2020).
9. **Gehring, P.**; van der Star, M.; Evangeli, C.; Le Roy, J.; Bogani, L.; Kolosov, O.; van der Zant, H. S. J. Efficient heating of single-molecule junctions for thermoelectric studies at cryogenic temperatures *Applied Physics Letters* **115**, 073103 (2019).
10. **Gehring, P.**; Thijssen, J. M.; van der Zant, H. S. J. Single-molecule quantum-transport phenomena in break junctions *Nature Reviews Physics* **1**, 381-396 (2019).

11. de Bruijckere, J.; **Gehring, P.**; Palacios-Corella, M.; Clemente-León, M.; Coronado, E.; Paaske, J.; Hedegård, P.; van der Zant, H. S. J. Ground-state spin blockade in a single-molecule junction *Physical Review Letters* **112**, 197701 (2019).
12. Caneva, S.; **Gehring, P.**; García-Suárez, V. M.; García-Fuente, A.; Stefani, D.; Olavarria-Contreras, I. J.; Ferrer, J.; Dekker, C.; van der Zant, H. S. J. Mechanically Controlled Quantum Interference in Graphene Break Junctions *Nature Nanotechnology* **13**, 1126-1131 (2018).
13. Dubois, V.; Raja, S. N.; **Gehring, P.**; Caneva, S.; van de Zant, H. S. J.; Niklaus, F.; Stemme, G. Massively parallel fabrication of crack-defined gold break junctions featuring sub-3 nm gaps for molecular devices *Nature Communications*, **9**, 3433 (2018).
14. Harzheim, A.; Spiece, J.; Evangeli, C.; McCann, E.; Falko, V.; Sheng, Y.; Warner, J.; Briggs, G. A. D.; Mol, J.; **Gehring, P.**; Kolosov, O. Geometrically Enhanced Thermoelectric Effects in Graphene Nanoconstrictions *Nano Letters* **18**, 7719-7725 (2018).
15. Talebi, N.; Esslinger, M.; Vogelgesang, R.; Khunsin, W.; **Gehring, P.**; Burghard, M.; Kern, K. Hyperbolic polaritonics of Bi<sub>2</sub>Se<sub>3</sub> nanoribbons at optical frequencies *SUBMITTED* (2018).
16. **Gehring, P.**; Harzheim, A.; Spiece, J.; Evangeli, C.; Sheng, Y.; Rogers, G.; Mishra, A.; Robinson, B.; Porfyrakis, K.; Warner, J. H.; Kolosov, O.; Briggs, G. A. D.; Mol, J. A. Field-Effect Control of Graphene-Fullerene Thermoelectric Nanodevices *Nano Letters* **17**, 7055-7061 (2017).
17. Sarwat, G. S.; **Gehring, P.**; Rodriguez Hernandez, G.; Warner, J. H.; Briggs, G. A. D.; Mol, J. A.; Bhaskaran, H. Scaling limits of graphene nanoelectrodes *Nano letters* **17**, 3688-3693 (2017).
18. **Gehring, P.**; Sowa, J. K.; Cremers, J.; Wu, Q.; Sadeghi, H.; Sheng, Y.; Warner, J. H.; Lambert, C. J.; Briggs, G. A. D.; Mol, J. A. Distinguishing lead and molecule states in graphene-based single-electron transistors *ACS Nano* **11**, 5325-5331 (2016).
19. Burghard, M.; **Gehring, P.** Ungewöhnliche Phasen im Flächenland *Physik in unserer Zeit* **47**, 272 (2016).
20. **Gehring, P.**; Sadeghi, H.; Sangtarash, S.; Lau, C. S.; Liu, J.; Ardavan, A.; Warner, J. H.; Lambert, C. J.; Briggs, G. A. D.; Mol, J. A. Quantum interference in graphene nanoconstrictions *Nano Letters* **16**, 1179–1184 (2016).
21. **Gehring, P.**; Reusch, F. B.; Mashhadi, S. S.; Burghard, M. and Kern, K. Surface oxidation effect on the electrical behaviour of Bi<sub>2</sub>Te<sub>2</sub>Se nanoplatelets *Nanotechnology* **27**, 285201 (2016).
22. Devender, **Gehring, P.**; Gaul, A.; Hoyer, A.; Vaklinova, K.; Mehta, R. J.; Burghard, M.; Borca-Tasciuc, T.; Singh, D. J.; Kern, K.; Ramanath, G. Harnessing Topological Band Effects in Bismuth Telluride Selenide for Large Enhancements in Thermoelectric Properties through Isovalent Doping *Advanced Materials* **28**, 6436-6441 (2016).
23. Puczkarski, P.; **Gehring, P.**; Lau, C.S.; Liu, J.; Ardavan, A.; Warner, J.H.; Briggs, G.A.D.; Mol, J.A. Three-terminal graphene single-electron transistor fabricated using feedback-controlled electroburning *Applied Physics Letters* **107**, 133105 (2015).
24. **Gehring, P.**; Urcuyo, R.; Duong, D.; Burghard, M.; Kern, K. Thin-layer black phosphorus/GaAs heterojunction p-n diodes *Applied Physics Letters* **106**, 233110 (2015).
25. **Gehring, P.**; Vaklinova, K.; Hoyer, A.; Benia, H.M.; Skakalova, V.; Argentero, G.; Eder, F.; Meyer, J.; Burghard, M.; Kern, K. Dimensional crossover in the quantum transport behaviour of the natural topological insulator Alekseyev *Scientific Reports* **5**, 11691 (2015).



26. Esslinger, M.; Vogelgesang, R.; Talebi, N.; Khunsin, W.; **Gehring, P.**; de Zuani, S.; Gompf, B.; Kern, K. Tetradymites as Natural Hyperbolic Materials for the Near-Infrared to Visible *ACS Photonics* **1**, 1285 (2014).
27. **Gehring, P.**; Burghard, M. Topologische Isolatoren *Physik in unserer Zeit* **45**, 299 (2014).
28. **Gehring, P.**; Benia, H. M.; Weng, Y.; Dinnebier, R.; Ast, C. R.; Burghard, M. and Kern, K. A Natural Topological Insulator *Nano Letters* **13**, 1179–1184 (2013).  
– highlighted in: *Nature* **495**, 153 (2013)
29. **Gehring, P.**; Gao, B. F.; Burghard, M. and Kern, K. Growth of High-Mobility Bi<sub>2</sub>Te<sub>2</sub>Se Nanoplatelets on hBN Sheets by van der Waals Epitaxy *Nano Letters* **12**, 5137–5142 (2012).
30. **Gehring, P.**; Gao, B. F.; Burghard, M. and Kern, K. Two-dimensional magnetotransport in Bi<sub>2</sub>Te<sub>2</sub>Se nanoplatelets *Applied Physics Letters* **101**, 023116 (2012).
31. Gao, B. F.; **Gehring, P.**; Burghard, M. and Kern, K. Gate-controlled linear magnetoresistance in thin Bi<sub>2</sub>Se<sub>3</sub> sheets *Applied Physics Letters* **100**, 212402 (2012).
32. **Gehring, P.**; Weng, Y.; Wu, Z.; and Strunk, H. P. Evidence for resonant energy transfer in terbium-doped (Al,In)N films *IOP Conference Series: Materials Science and Engineering* **15**, 012007 (2010).
33. **Gehring, P.**; Weng, Y.; Wu, Z.; and Strunk, H. P. Photoluminescence from Al<sub>x</sub>In<sub>1-x</sub>N layers doped with Tb<sup>3+</sup> ions *Journal of Physics: Conference Series* **281**, 012014 (2010).