

Waveguide technology

Jo, G., Edinger, P., Bleiker, S. J., Wang, X., Takabayashi, A. Y., Sattari, H., Quack, N., Jezzini, M., Lee, J. S., Verheyen, P., Zand, I., Khan, U., Bogaerts, W., Stemme, G., Gylfason, K. B. & Niklaus, F. **Wafer-level hermetically sealed silicon photonic MEMS**. *Photonics Research* 10, A14 (2022). doi: [10.1364/PRJ.441215](https://doi.org/10.1364/PRJ.441215)

Lemme, M. C., Wagner, S., Lee, K., Fan, X., Verbiest, G. J., Wittmann, S., Lukas, S., Dolleman, R. J., Niklaus, F., van der Zant, H. S. J., Duesberg, G. S. & Steeneken, P. G. **Nanoelectromechanical Sensors Based on Suspended 2D Materials**. *Research* 2020, 1–25 (2020). doi: [10.34133/2020/8748602](https://doi.org/10.34133/2020/8748602)

Briano, F. O., Errando-Herranz, C. & Gylfason, K. B. **On-Chip Dispersion Spectroscopy of CO₂ Using a Mid-Infrared Microring Resonator**. in *Conference on Lasers and Electro-Optics STh1N.3 (OSA, 2020)*. doi: [10.1364/CLEO_SI.2020.STh1N.3](https://doi.org/10.1364/CLEO_SI.2020.STh1N.3)

2D material development

Lemme, M. C., Akinwande, D., Huyghebaert, C. & Stampfer, C. **2D materials for future heterogeneous electronics**. *Nature Communications* 13, 1392 (2022). doi: [10.1038/s41467-022-29001-4](https://doi.org/10.1038/s41467-022-29001-4)

Antidormi, A. & Cummings, A. W. **All-carbon approach to inducing electrical and optical anisotropy in graphene**. *AIP Advances* 11, 115007 (2021). doi: [10.1063/5.0062521](https://doi.org/10.1063/5.0062521)

Prechtl, M., Parhizkar, S., Hartwig, O., Lee, K., Biba, J., Stimpel-Lindner, T., Gity, F., Schels, A., Bolten, J., Suckow, S., Giesecke, A. L., Lemme, M. C. & Duesberg, G. S. **Hybrid Devices by Selective and Conformal Deposition of PtSe₂ at Low Temperatures**. *Advanced Functional Materials* 2103936 (2021). doi: [10.1002/adfm.202103936](https://doi.org/10.1002/adfm.202103936)

Canto, B., Otto, M., Powell, M. J., Babenko, V., O'Mahony, A., Knoops, H. C. M., Sundaram, R. S., Hofmann, S., Lemme, M. C. & Neumaier, D. **Plasma-Enhanced Atomic Layer Deposition of Al₂O₃ on Graphene Using Monolayer hBN as Interfacial Layer**. *Advanced Materials Technologies* 2100489 (2021). doi: [10.1002/admt.202100489](https://doi.org/10.1002/admt.202100489)

Devices

Parhizkar, S., Prechtl, M., Giesecke, A. L., Suckow, S., Wahl, S., Lukas, S., Hartwig, O., Negm, N., Quellmalz, A., Gylfason, K., Schall, D., Wuttig, M., Duesberg, G. S. & Lemme, M. C. **Two-Dimensional Platinum Diselenide Waveguide-Integrated Infrared Photodetectors**. *ACS Photonics* acsphotonics.1c01517 (2022). doi: [10.1021/acsphotonics.1c01517](https://doi.org/10.1021/acsphotonics.1c01517)

Quellmalz, A., Wang, X., Sawallich, S., Uzlu, B., Otto, M., Wagner, S., Wang, Z., Prechtl, M., Hartwig, O., Luo, S., Duesberg, G. S., Lemme, M. C., Gylfason, K. B., Roxhed, N., Stemme, G. & Niklaus, F. **Large-area integration of two-dimensional materials and their heterostructures by wafer bonding**. *Nature Communications* 12, 917 (2021). doi: [10.1038/s41467-021-21136-0](https://doi.org/10.1038/s41467-021-21136-0)

Parhizkar, S., Prechtl, M., Giesecke, A. L., Suckow, S., Lukas, S., Hartwig, O., Quellmalz, A., Gylfason, K. B., Schall, D., Duesberg, G. S. & Lemme, M. C. **Waveguide-Integrated Photodetectors based on 2D Platinum Diselenide**. in *2021 Device Research Conference (DRC) 1–2 (IEEE, 2021)*. doi: [10.1109/DRC52342.2021.9467238](https://doi.org/10.1109/DRC52342.2021.9467238)

Antidormi, A. & Cummings, A. W. **Optimizing the Photothermoelectric Effect in Graphene**. *Physical Review Applied* 15, 054049 (2021). doi: [10.1103/PhysRevApplied.15.054049](https://doi.org/10.1103/PhysRevApplied.15.054049)

Quellmalz, A., Sawallich, S., Prechtl, M., Hartwig, O., Luo, S., Wagner, S., Duesberg, G. S., Lemme, M. C., Niklaus, F. & Gylfason, K. B. **Stacking of Two-Dimensional Materials to Large-Area Heterostructures by Wafer Bonding**. in *Conference on Lasers and Electro-Optics SW3F.2 (OSA, 2021)*. doi: [10.1364/CLEO_SI.2021.SW3F.2](https://doi.org/10.1364/CLEO_SI.2021.SW3F.2)

Intelligent sensors

Wang, Z., Hemmetter, A., Uzlu, B., Saeed, M., Hamed, A., Kataria, S., Negra, R., Neumaier, D. & Lemme, M. C. **Graphene in 2D/3D Heterostructure Diodes for High Performance Electronics and Optoelectronics**. *Advanced Electronic Materials* 7, 2001210 (2021). doi: [10.1002/aelm.202001210](https://doi.org/10.1002/aelm.202001210)

You, Y., Xu, A. & Oechtering, T. J. **Belief Function Fusion based Self-calibration for Non-dispersive Infrared Gas Sensor**. in *2020 IEEE SENSORS 1–4 (2020)*. doi: [10.1109/SENSORS47125.2020.9278753](https://doi.org/10.1109/SENSORS47125.2020.9278753)

