

Prof. Dr. Michael Vollmer



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Teaching

- experimental physics
- physical and technical optics
- laser physics
- vacuum physics
- spectroscopy
- infrared physics and technology
- thin film optics
- renewable energy
- English in physics and technology

Research

three main fields:

- 1) Infrared Thermal Imaging
 - 2) Atmospheric optics / optics
 - 3) Didactics of physics, physics education research
- see also list of publications

Published books

Books:

1. U. Kreibitz und M. Vollmer:
Optical Properties of Metal Clusters,

- Springer Series Materials Science 25, Springer (1995)
2. M. Vollmer
Lichtspiele in der Luft - atmosphärische Optik für Einsteiger
 Spektrum-Elsevier (2005)
 3. M. Vollmer, K.-P. Möllmann
Infrared Thermal Imaging: Fundamentals, Research and Applications
 Wiley (2010)
 (also Spanish and Korean translations)
 4. M. Vollmer, K.-P. Möllmann
Infrared Thermal Imaging: Fundamentals, Research and Applications
 2nd completely revised and extended ed., Wiley (2018)
 5. M. Vollmer
Atmosphärische Optik für Einsteiger - Lichtspiele in der Luft
 2nd ed, Springer (2019)

Publications IR imaging (since 2005)

- *Heiße Quellen im Wärmebild Yellowstonepark im Infrarot*, M. Vollmer, J.A. Shaw, P.W. Nugent, W. Harris, Physik in unserer Zeit **50**/5, 244-250 (2019)
- Near infrared photography of a morphological phenomena*, J.A. Shaw, M. Vollmer, Proc. SPIE 11143, Fifteenth Conference on Education and Training in Optics and Photonics: ETOP 2019, 111431P (2 July 2019); doi: 10.1117/12.2523165
- Infrared camera calibration for smartphone : facts and needs*, M. Vollmer, K.-P. Möllmann, Phys. Educ. **53**, 065019 (2018), 10 pages
- Thermal imaging in nature*, M. Vollmer, K.-P. Möllmann, Inframation 2018 Proceedings, 2018-063
- Measurement of SWIR background using the miniaturized camera*, A. Richard, M. Hübner, M. Vollmer, Proc. SPIE 10625, Infrared Imaging Systems : Design, Analysis, Modeling, and Testing XXIX, 106250P (2018)
- Teaching physics and understanding infrared thermal imaging*, M. Vollmer, K.-P. Möllmann, in Education and Training in Optics and Photonics (ETOP) 2017, edited by X. Li and Xi-Cheng Zhang, Proc. of SPIE

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- *Infrared Yellowstone*, J.A. Shaw, P.W. Nugent, W. Harris, M. Vollmer, *Optics and Photonics News* 28 (6), 37-43 (2017)
- *NIR photography and NIR thermal cameras*, M. Vollmer, K.-P. Möllmann, *Inframation* 2016 Proceedings, 2016-039
- *Infrared moon imaging for remote sensing of atmospheric smoke layers*, J.A. Shaw, P.W. Nugent, M. Vollmer, *Applied Optics* 54/4, B64-B75 (2015)
- *The Physics of Near-Infrared Photography*, K. Mangold, J.A. Shaw, M. Vollmer, *Eur. J. Phys.* 34/6, S51-71 (2013)
- *The Allure of Multicolored Images Building Thermography Examined Closely*, K.-P. Möllmann, M. Vollmer, *Inframation* 2013 Proceedings, Vol14
- *Moisture detection at building walls using evaporative cooling*, F. Pinno, K.-P. Möllmann, M. Vollmer, *Inframation* 2013 Proceedings, Vol14
- *Measurements of the surface temperature of the moon from earth with IR cameras*, M. Vollmer, K.-P. Möllmann, J.A. Shaw, P.W. Nugent, *Proceedings Temperatur 2013*, Ed.:PTB Berlin, p. 149-154 (2013)
- *Einfache Charakterisierung der zeitlichen und räumlichen Auflösung von Wärmebildkameras*, K.-P. Möllmann, M. Vollmer, *Proceedings Temperatur 2013*, Ed.:PTB Berlin, p. 137-142 (2013)
- *The magic of the invisible: using IR imaging in physics education*, M. Vollmer, K.-P. Möllmann, *Inframation* 2013 Proceedings, Vol14
- *Moisture detection at building walls using evaporative cooling*, F. Pinno, K.-P. Möllmann, M. Vollmer, *Inframation* 2013 Proceedings, Vol14
- *Jenseits unserer Wahrnehmung*, M. Vollmer, *PhysikJournal* 12 Nr. 8/9, 47-51(2013)
- *Characterization of IR cameras in student labs*, M. Vollmer, K.-P. Möllmann, *Eur. J. Phys.* 34/6, S73-90 (2013)
- *The Allure of Multicolored Images Building Thermography Examined Closely*, M. Vollmer, K.-P. Möllmann, in *Renewable Energy Sustainable Concepts for the Energy Change*, Eds.: R. Wengenmayr, Th. Bührcke, 2nd ed., Wiley VCH (2013)
- *Wie warm ist es auf dem Mond*, M. Vollmer, K.-P. Möllmann, *Sterne und Weltraum* 51, 82-86 (Dez. 2012)

- Dark colors of building walls thermal problems due to solar load, F. Pinno, K.-P. Möllmann and M. Vollmer, in Inframation 2012, Proc. Vol 13
- Surprising warm edges associated with moisture on surfaces, M. Vollmer, K.-P. Möllmann, S. Wood, in Inframation 2012, Proc. Vol 13
- Surface temperatures of the Moon: measurements with commercial infrared cameras, M. Vollmer, K.-P. Möllmann, Eur. J. Phys. 33, 1703-1719 (2012)
- CO2 Detektion mit IR Kameras: Grundlagen, Experimente und Anwendungen, M. Vollmer; K.-P. Möllmann, Technisches Messen (tm) 79/1, 65-72 (2012)
- Optics of glass fronts of buildings: the science of skyscraper death rays , K.-P. Möllmann, M. Vollmer, M. Winburn, Inframation 2011, Proc. Vol 12, p. 79-92
- CO2-Nachweis mit Infrarotkameras, M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit 43/4, 181-185 (2012)
- Die Versuchung bunter Bilder Gebäudethermographie unter der Lupe, M. Vollmer, K.-P. Möllmann, F. Pinno, Physik in unserer Zeit 42 (4), 176-184 (2011); gekürzte Version: p. 164-167 in: Erneuerbare Energie, 3. Auflage, Hrsg. Thomas Bürke, Roland Wengenmayr, Wiley-VCH, Weinheim, 2011
- Measurements of sun and moon with IR cameras: effects of air mass, M. Vollmer, F. Pinno, K.-P. Möllmann, Inframation 2010, Proc. Vol 11, p. 57-74
- Two-color or ratio thermal imaging - potentials and limits, K.-P. Möllmann , F. Pinno, M. Vollmer, Inframation 2010, Proc. Vol 11, p.41-56
- Improved sensitivity for blower door thermography using image subtraction, F. Pinno, M. Vollmer, K.-P. Möllmann, Inframation 2010, Proc. Vol 11, p. 29-40
- IR imaging of gases: potential applications for CO2 cameras, M. Vollmer, K.-P. Möllmann, Inframation 2009, Proc. Vol 10, p.113 - 124
- IR imaging of gases: quantitative analysis, M. Vollmer, K.-P. Möllmann, Inframation 2009, Proc. Vol 10, p. 99 - 112
- IR feedback loops to spotlights: thermography and contemporary dancing, M. Vollmer, M. Vujkovic , Y.Trellu, K.-P. Möllmann, Inframation 2009, Proc. Vol 10, p. 89 - 97
- Solar load and reflection effects and respective time constants in outdoor building inspections, F. Pinno, K.-P. Möllmann and M. Vollmer, Inframation 2009, Proc. Vol 10, p.319 - 330
- Microscopic and high-speed thermal imaging: a powerful tool in physics R&D, K.-P. Möllmann, F. Pinno, M. Vollmer, Inframation 2009, Proc. Vol 10, p. 303 - 317
- Perspectives of IR imaging for industrial detection and monitoring of CO2, M. Vollmer, K.-P. Möllmann,

Proceedings Temperatur 2009, Ed.:PTB Berlin, p.27-36 (2009)

- Thermographie - Grundlagen, Forschung und moderne Anwendungen in Industrie und Technik, M. Vollmer, K.-P. Möllmann, Praxis d. Naturwiss. Physik, 57/8, 5-14 (2008)
- Infrarotkameras - es gibt mehr zu sehen als unsere Augen wahrnehmen, M. Vollmer, K.-P. Möllmann, Naturwiss. Rundschau 61/11, 557-565 (2008)
- Cheese cubes, light bulbs, soft drinks: An unusual approach to study convection, radiation and size dependent heating and cooling, M. Vollmer, K.-P. Möllmann, F. Pinno, Inframation 2008 Proceedings Vol. 9, 477-492
- Night Sky Radiant Cooling Influence on Outdoor Thermal Imaging Analysis, K.-P. Möllmann, F. Pinno, M. Vollmer, Inframation 2008 Proceedings Vol. 9, 279-295
- Thermography of window panes problems, possibilities and troubleshooting, F. Pinno, K.-P. Möllmann and M. Vollmer, Inframation 2008 Proceedings Vol. 9, 355-362
- Infrared thermal imaging as a tool in university physics education, K.-P. Möllmann and M. Vollmer, Eur. J. Phys. 28, S37-S50 (2007)
- Looking through matter: quantitative IR imaging when observing through IR windows, M. Vollmer, K.-P. Möllmann, F. Pinno, Inframation 2007, Proceedings Vol. 8, 109-127
- Influence of wind effects on thermal imaging results Is the wind chill effect relevant ? K.-P. Möllmann, F. Pinno, M. Vollmer, Inframation 2007, Proceedings Vol. 8, 21-31
- Cost and energy savings for a factory building after modernizing the heating system, F. Pinno, K.-P. Möllmann and M. Vollmer, Inframation 2007, Proceedings Vol. 8, 521-527
- Influence of gaseous species on thermal infrared imaging, D. Karstädt, K.P. Möllmann, F. Pinno and M. Vollmer, Inframation 2006 Proceedings Vol.7, 65-78
- Thermal image quality Visualization of spatial and thermal resolution in thermal imaging, D. Karstädt, K.P. Möllmann, F. Pinno, and M. Vollmer, Inframation 2006 Proceedings Vol.7, 79-91
- Energy savings for an old factory building by optimization of the heating system, D. Karstädt, K.P. Möllmann, F. Pinno, and M. Vollmer, Inframation 2006 Proceedings Vol.7, 253-261
- Thermography of microwave ovens, M. Vollmer, F. Pinno, K.-P. Möllmann, D. Karstädt, Inframation 2005 Proceedings Vol.6, 29-40
- Optimization, quality control and minimization of damages of floor heating systems, F. Pinno, D. Karstädt, K.-P. Möllmann, and M. Vollmer, Inframation 2005 Proceedings Vol.6, 313-321
- Selected critical applications for thermography: convections in fluids, selective emitters and highly reflecting materials, mK.-P. Möllmann, D. Karstädt, F. Pinno, and M. Vollmer, Inframation 2005

Publications Atmospheric Optics / Optics (since 2005)

- Extended visual range during solar eclipses, M.Vollmer, J.A. Shaw, Applied Optics **57**/14, 140001 (2018)
- Atmospheric Optics in the Near Infrared, J.A. Shaw, M. Vollmer, Applied Optics, **56**/19, G145 (2017)
- Blue sun glints on water viewed through a polarizer, J.A. Shaw, M. Vollmer, Applied Optics, **56**/19, G36 (2017)
- Near infrared photography of atmospheric optical phenomena, J.A. Shaw, M. Vollmer, Proc. SPIE 11143, Fifteenth Conference on Education and Training in Optics and Photonics: ETOP 2019, 111431P (2 July 2019); doi: 10.1117/12.2523165
- Extended visual range: an observation during a total solar eclipse, M. Vollmer, J.A. Shaw, Proc. SPIE 11143, Fifteenth Conference on Education and Training in Optics and Photonics: ETOP 2019, 111431Q (2 July 2019); doi: 10.1117/12.2523167
- Blue sun reflected from water: optical lessons from observations of nature, J.A. Shaw, M. Vollmer, in Education and Training in Optics and Photonics (ETOP) 2017, edited by Xu Liu and Xi-Cheng Zhang, Proc. of SPIE Vol. 10452, 104523B-1
- Colors of the Yellowstone Thermal Pools for Teaching Optics , J.A. Shaw, P.W. Nugent, M. Vollmer, Education and Training in Optics and Photonics (ETOP) 2015, edited by Eric Cormier, Laurent Sarger, Proc. of SPIE Vol. 9793, 97931S
- Colors of thermal pools at Yellowstone National Park, P.W. Nugent, J.A. Shaw, M. Vollmer, Applied Optics 54/4, B128-B139 (2015)
- Artificially generated halos: rotating samples crystals around various axes, M. Großmann, K.-P. Möllmann, M. Vollmer, Applied Optics 54/4, B97-B106 (2015)
- Infrared moon imaging for remote sensing of atmospheric smoke layers, J.A. Shaw, P.W. Nugent, M. Vollmer, Applied Optics 54/4, B64-B75 (2015)
- Visible and invisible mirages: Comparing inferior mirages in the visible and thermal infrared, M.Vollmer, J.A. Shaw, P.W. Nugent, Applied Optics 54/4, B76-B84 (2015)
- Flimmernde Luft und funkelnde Sterne, (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 46/5, 254-255 (2015)
- Double pane windows elastic deformations, gas thermodynamics, thermal and optical phenomena,

M. Vollmer, K.-P. Möllmann, H.J. Schlichting, Eur. J. Phys. 35, 045023 (2014)

- Achtung Solarofen, Kaustiken von Hochhausverglasungen, M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 45/3, 134-139 (2014)

- Atmospheric Optical Phenomena and Radiative Transfer, S. Gedzelman, M. Vollmer, Bull. Am. Met. Soc. 89, 471-485 (April 2008)
- Optical Phenomena in the Atmosphere; M. Vollmer, p. 1182-1203, Sect. 19.6, in Springer Handbook of Lasers and Optics, F. Träger (Hrsg.) 2007
- Measurements and predictions of the illuminance during a solar eclipse, K.-P. Möllmann and M. Vollmer, Eur. J. Phys. 27 (2006) 1299-1314
- Colors of the sun and moon: the role of the optical air mass, M. Vollmer, S. Gedzelman, Eur. J. Phys. 27 299-309 (2006)
- Farben der Sonne: die Rolle der optischen Dicke der Atmosphäre, M. Vollmer, Praxis d. Naturwiss. Physik, 55/3, 24 28 (2006)
- Rings around sun and moon: coronae and diffraction, L. Cowley, Ph. Laven, and M. Vollmer, Physics Education 40/1, 51-59 (2005)
- Koronen: farbige Ringe um Sonne und Mond; L. Cowley, P. Laven, M. Vollmer, Physik in unserer Zeit 36/6, 266- 273 (2005)
- Effects of absorbing particles on coronas and glories, M. Vollmer, Appl. Opt. 44/27, 5658-5666 (2005)
- Experimental simulations of pollen coronas, W. Schneider, M. Vollmer, Appl. Opt. 44/27, 5746-5753 (2005)

Publications Didactics of physics / Miscellaneous (since 2005)

- *Blue the color of (p)reacher*, M. Vollmer, A. Mard, Phys. Ed. c. **54**, 45001 (2019) (10 p)
- *The freezing of lake in winter*, M Vollmer, Eur. J. Phys. **40** (2019) 35101 (20p)
- *Studying the radiation from light emitting diode semiconductor laser in applied physics laboratory*, K.-P. Möllmann, M. Regehly, M. Vollmer, Proc. SPIE 11143, Fifteenth Conference on Education and Training in Optics and Photonics: ETOP 2019, 1114312 (2 July 2019); doi: 10.1117/12.2523387
- *Alle kalte Kaffee* (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit **50**/5, 252-253 (2019)
- *Da langame Verdunstung am Wasser* (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit **50**/2, 97-98 (2019)
- *Manche mögen kochend heiß* (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit **50**/1, 46-47 (2019)
- *Direction of wind measurement in the atmosphere during a national holiday in New Zealand*, M.

Vollmer, Phys. Educ. **53** 033007 (2018), 5 pages

- *Time-lap e ideo for ph ic ed ca ion: pecific e ample* , M. Vollmer, K.-P. Möllmann, Phys. Educ. **53** 035030 (2018), 11 pages
- *Slo speed fa mo ion: ime-lap e recording in ph ic ed ca ion*, M. Vollmer, K.-P. Möllmann, Phys. Educ. **53** 035019 (2018), 11 pages
- Die Q al der Wahl an Weihnach en* (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit **49**/6, 306 (2018)
- Und ie dreh ich doch* (Rasante Physik), M. Vollmer | K.-P. Möllmann, Physik in unserer Zeit **49**/5, 254 (2018)
- Von Ei rfehn nd gefrorenen Seen* (Rasante Physik), M. Vollmer | K.-P. Möllmann, Physik in unserer Zeit **49**/4, 201-202 (2018)
- Slo Speed Fa Mo ion - F nk ion nd Technik on Zei rafferkamera* , M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit **49**/4, 190-193 (2018)
- Thom on Fliegender Ring: al bekann doch rickreich, (Ra an e Ph ik)*, M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft **48**/5, 251-253 (2017)
- Und e erde Fe er - Teil 2: Fe er e ge* (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft **48**/2, 96-97 (2017)
- Hei e Ph ik im Yello one-Park*, M. Vollmer, J.A. Shaw, P.W. Nugent, Physik in unserer Zeit Heft **48**/1, 37-42 (2017)
- Und e erde Fe er - Teil 1: S reichh l er!* (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft **48**/1, 43-44 (2017)
- Teaching Electric Fences: The Physics Behind the Brainiac Video, M. Vollmer, The Physics Teacher **54**, 492-496 (2016)
- *M ic hro gh he kin imple demon ra ion of h man elec rical cond c i* , M. Vollmer, K.-P. Möllmann, Phys. Educ. **51** (2016) 034002 (8pp)
- *F n i h ph ic hand on e perimen in ph ic eaching*, M. Vollmer, p. 293-301, Veletrh nápad f unitel f fyziky 20 (2016) (Proceedings 20th Czech Physics Teacher Training Conference , Prag, 2015) Ed.: V. Koudelková, 2016, ISBN 978-80-87343-58-6
- Fl ch ige Regenb gen ein elner Tropfen* (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft **47**/6, 305-306 (2016)
- Elko oder B ller: die Pol ng mach !* (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit

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- The optics and physics of near infrared imaging, M. Vollmer, K.-P. Möllmann, J.A. Shaw, in Education and Training in Optics and Photonics (ETOP) 2015, edited by Eric Cormier, Laurent Sarger, Proc. of SPIE Vol. 9793, 97930Z
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- Flimmernde Luft und funkelnde Sterne, (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 46/5, 254-255 (2015)
- Der Trick mit der Tischdecke, (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 46/4, 199-201 (2015)
- Springende Hüpfgummis, (Rasante Physik) M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 46/3, 149-150 (2015)
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- Achtung Solarofen, Kaustiken von Hochhausverglasungen, M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 45/3, 134-139 (2014)
- Das farbenprächtige Glitzern frischen Schnees, M. Vollmer, J. A. Shaw, Physik in unserer Zeit Heft 45/2, 97-98 (2014)
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- Light cone: Engaging students of all levels in processes that physicists use in research, E. Etkina, G. Planinsic, M. Vollmer, Am. J. Phys. 81/11, 815-822 (2013)
- Is there a maximum size of water drops in nature, M. Vollmer, K.-P. Möllmann, The Physics Teacher 51, 400 - 402 (October 2013)
- Removing coins from a dice tower: no magic just physics, M. Vollmer, K.-P. Möllmann, The Physics Teacher 51, 212-211 (April 2013)
- Measuring distances in google earth, Michael Vollmer, Phys. Ed. 48/2, 145-149 (2013)
- James Bond und die zerplatzenden Christbaumkugeln (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit Heft 44/6, 304-306 (2013)
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- Die Münze in Würfelturm (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit, 44/4, 200-201 (2013)
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- Prost Neujahr: die Physik von Champagnerflaschen (Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit, 43/6, 307 - 308 (2012)
- Oscillating droplets and incompressible liquids: slow motion visualization of experiments with fluids, M. Vollmer, K.-P. Möllmann, Physics Education 47, 664-679 (2012)

- Low cost hands-on experiments for Physics teaching, M. Vollmer, K.-P. Möllmann, Lat. Am. J. Phys. Educ. Vol. 6, Suppl. I, pp. 3-9 (2012). www.lajpe.org
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- Hochgeschwindigkeitskameras im Physikunterricht, M. Vollmer, K.-P. Möllmann, MNU 65/6 349-355 (2012)
- Tropfen auf dem kalten Wein (Rubrik Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit, 43/5, 252-253 (2012)
- Raindrops keep falling on my head (Rubrik Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit 43/4, 200-201 (2012)
- Lorentz-Pendel in der Glühbirne (Rubrik Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit, 43 (2), 96-97 (2012)
- Feynmans Rätsel der brechenden Spaghetti (Rubrik Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit, 43 (1), 46-47 (2012)
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- Von Bällen und Schlägern (Rubrik Rasante Physik), M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit, 42 (4), 202-203 (2011)
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- High Speed Slow Motion: Technik digitaler Hochgeschwindigkeitskameras, M. Vollmer, K.-P. Möllmann, Physik in unserer Zeit 42 (3), 144- 148 (2011)
- Newton's law of cooling revisited, M. Vollmer, Eur. J. Phys. 30, 1063-1084 (2009)
- A long tradition of in-service training for physics teachers by the German Physical Society, M. Vollmer, V. Nordmeier, ICPE Newsletter 58, p. 3-4 (2009)
- The surface to volume ratio in thermal physics: from cheese cube physics to animal metabolism, G. Planinsic, M. Vollmer, EJP 29/2, 369-384(2008), corrigendum 29/3, 661 (2008)
- Ins eigene Segel blasen: von grundlegender Physik zur Schubumkehr bei Flugzeugtriebwerken, K.-P. Möllmann, M. Vollmer, Physik in unserer Zeit 39/5, 241-245 (2008)
- Michelson Interferometer for your kitchen table, M. Vollmer, K.-P. Möllmann, The Physics Teacher 46, 114-117 (2008)
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- Locomotion by blowing into the sail of a sailboat? From a basic physics question to thrust reversal of jet airplanes, M. Vollmer, K.-P. Möllmann, F. Arnold, Phys. Ed. 42, 369-377 (2007)
- Physiklehrerweiterbildung am Physikzentrum Bad Honnef, V. Nordmeier, W.B. Schneider, M. Vollmer, S. 61-63 in B. Schoch (Hrsg.), Physikzentrum Bad Honnef- Ein Platz für Dialog und Inspiration, Bonn (2006)
- Learning Physics from the experiments, Ch. Chiaverina, M. Vollmer, Girep seminar in Ljubljana 2005, ed. G. Planinsic, see: www.girep2005.fmf.uni-lj.si
- Diffraction revisited, position of diffraction spots upon rotation of a transmission grating, M. Vollmer, Physics Education, 40, 562-565 (2005)
- Hot gases: transition from line spectra to thermal radiation, M. Vollmer, Am. J. Phys. 73, 215-223 (2005)
- Anfassen erwünscht Science Center unter der Lupe, W. Schneider, M. Vollmer, Physik in unserer Zeit 36/2, 98-99 (2005)

- Zur Intonation von Blechblasinstrumenten bei sehr niedrigen Umgebungstemperaturen, M. Vollmer, K. Wogram, Instrumentenbau-Zeitschrift - Musik International 59/3-4, 69-74 (2005)

Selected English Conference Talks (since 2005)

- Locomotion by blowing into the sail of your own sailboat: Muenchhausen story or real physics? 3rd International GIREP Seminar, Ljubljana, 09/2005
- Thermography of microwave ovens, Inframation 2005 in Las Vegas / USA, 10/2005
- Hands-on experiments, Fisica Nocturna, Puebla, Mexico, 05/2006
- Influence of Gaseous species on Thermal Infrared Imaging, Inframation 2006 in Las Vegas/USA, 10/2006
- Demonstration of Quetelet fringes, Illuminance during a solar eclipse and Luminance during a total lunar eclipse, 9th International Meeting on Light and Color in Nature in Bozeman, Montana (USA), 06/2007
- Looking through matter: quantitative IR imaging when observing through IR windows, Physics for Nonscientists, Inframation 2007 in Las Vegas/USA, 10/2007
- Cheese cubes, light bulbs, soft drinks: An unusual approach to study convection, radiation and size dependent heating and cooling, Inframation 2008 in Reno/ USA, 11/2008
- IR imaging of gases: potential applications for CO2 cameras, IR feedback loops to spotlights: thermography and contemporary dancing, Inframation 2009 in Las Vegas/ USA, 10/2009
- Inframation 2009, Las Vegas, 10/2009
- High speed - slow motion I: new insights for hands on experiments in mechanics, II : more experiments using gases, fluids, heat and electromagnetism, GIREP-ICPE-MPTL International

- IR Imaging of CO₂: Basics, Experiments, and Potential Industrial Applications, IRS2, Nürnberg, 05/2011
- Low cost hands-on experiments for physics teaching, ICPE, Mexico City, 08/2011
- Optics of glass fronts of buildings: the science of skyscraper death rays and Camera Performance and Simple Image Processing for Everybody (with K.-P. Möllmann), Inframation 2011 in Las Vegas/USA, 11/2011
- Beautiful phenomena in the skies: a colorful journey in the realm of atmospheric optics, DGaO , Eindhoven /NL, 06/2012
- Surprising warm edges associated with moisture on surfaces, Inframation 2012 in Orlando / USA, 11/2012
- Brilliant colors from a white snow cover, Visible and invisible mirages: comparing inferior mirages in the visible and thermal infrared spectral range, Light and Color, Fairbanks/Alaska (USA)m 08/2013
- The magic of the invisible: using IR imaging in physics education, Inframation 2013 in Orlando / USA, 11/2013
- IR Imaging Master Class History, Science and Modern Technology, 4h workshop (with K.-P. Möllmann), Inframation 2015 in Nashville/Tennessee (USA), 05/2015
- Optics and Physics of Near Infrared imaging, Education and Training in Optics, Bordeaux/ France, 06/2015
- Experiments in Physics Education, Physics Teachers Invention Fair, Prag/Cz, 08/2015
- High Speed Cameras in Physics Education, AAPT New Orleans/USA, 01/2016
- Optical effects due to man-made structures, Light and Color in Nature in Granada / Spanien, 06/2016
- The optics and physics of NIR imaging, Light and Color in Nature in Granada / Spanien, 06/2016
- NIR photography and NIR thermal cameras, Inframation, Las Vegas, 09/2016
- Workshop Basics of thermography: IR camera parameters and selected topics, Inframation, Las Vegas, 09/2016
- Photonics in Nature: Yellowstone National Park in IR, ETOP, Hangzhou/China, 05/2017
- Teaching physics and understanding infrared thermal imaging, ETOP, Hangzhou/China, 05/2017
- Blue sun reflected from water: optical lessons learned from observations of nature, ETOP, Hangzhou/China, 05/2017
- Using action cams to teach and learn physics, AAPT, San Diego, 01/2018
- Thermal Imaging for every Teacher, AAPT, San Diego, 01/2018

- Thermal imaging in nature, Inframation, Austin/Texas (USA), 10/2018
- Studying the transition from light emitting diodes to semiconductor lasers in physics laboratories, ETOP, Quebec (Kanada) 05/2019
- Extended visual range: an observation during a total solar eclipse, ETOP, Quebec (Kanada) 05/2019
- Intrinsic blue color of clearest natural water, Light and Color in Nature, Bar Harbor / Maine (USA) 07/2019
- 530 km record visual range observation: can it be true? Light and Color in Nature, Bar Harbor / Maine (USA) 07/2019
- Visual range changes during the 2017 eclipse, , Light and Color in Nature, Bar Harbor / Maine (USA) 07/2019

Physics teacher training

International

1. Annual teacher training of Austrian Physical Society, in Vienna/Austria (with K.-P. Möllmann):
 02/2000: Von Sonnenhunden, Seeungeheuern und grünem Strahl, ein Ausflug in die atmosphärische Optik; Es gibt mehr zu sehen als unsere Augen wahrnehmen
 02/2011: High speed - slow motion: Experimente mit der Hochgeschwindigkeitskamera
2. Technorama teacher training for Swiss physics teachers in Winterthur/CH (with K.-P. Möllmann):
 03/2003: Low cost Experimente für den Physikunterricht,
 09/2004: Lernen am Phänomen - low cost Experimente im naturwissenschaftlichen Unterricht
 09/2006: Lichtspiele in der Luft - optische Phänomene der Atmosphäre / Schulexperimente mit Lasern
 02/2010: High speed - slow motion: Experimente mit der Hochgeschwindigkeitskamera
 02/2014: Freihandexperimente und Experimente mit IR Kameras
3. Fisica Nocturna, Puebla, Mexico, 05/2006:
 05/2006: Hands-on experiments in physics education
4. Physics Teacher Training Workshops in Windhoek, Namibia (1 week, with K.-P. Möllmann):
 03/2008: Hands-on experiments in physics education

07/2009: Hands-on experiments in physics education

Nationwide in Germany

The Physikzentrum Bad Honnef/Germany (www.pbh.de) hosts week-long teacher training courses (several per year) for physics teachers from all over Germany, typically 50 to 100 participants funded by the German Physical Society (DPG, www.dpg-physik.de).

The following courses were organized/coorganized:

1. Licht, Schatten und Farben in der Umwelt (1997) with H.J. Schlichting (Essen)
2. Physik und Musik (2000) with H.J. Schlichting (Essen)
3. Physikalische Aspekte der Meteorologie (2001), with W. Wehry (Berlin)
4. Naturphänomene für den Physikunterricht aus fachdidaktischer und fachwissenschaftlicher Sicht (2002), with W. Schneider (Erlangen)
5. Physik der Erde (2003), with W. Schneider (Erlangen)
6. Laser, Grundlagen und Anwendungen in Forschung und Technik (2005), with W. Schneider (Erlangen)
7. Regenerative Energien (2006), with V. Nordmeier (Berlin)
8. Physik und Sport (2008), with L. Mathelitsch (Graz)
9. Naturphänomene (2010), with H.J. Schlichting (Münster)
10. Thermodynamik (2011), with H. Engel (Oldenburg)
11. Klima, Atmosphäre, Umwelt, (2016), with L. Wöste (Berlin)

Regional in Brandenburg

The physics group of the University of Applied Sciences in Brandenburg organizes 1-day physics teacher training courses, typically for 100 teachers with main topic of low cost experiments, funded by the Wilhelm und Else Heraeus-foundation (www.we-heraeus-stiftung.de) and the DPG (www.dpg-physik.de)

Organisation: M. Vollmer; experiments with K.-P. Möllmann, since 2000 additional external speaker

1. 1998: Mechanik, Akustik, Fluide

2. 1998: Wärmelehre
3. 1999: Elektrodynamik
4. 1999: Optik
5. 2000: Moderne Physik, physikalisches Spielzeug (C. Ucke/München)
6. 2001: Physik im Alltag, Low cost high tech-Experimente (W. Stetzenbach/Winnweiler)
7. 2002: Low cost Experimente, Messwerterfassung easy und low cost (V. Nordmeier/Münster, Komplexität und Selbstorganisation (H.-J. Schlichting/Münster)
8. 2003: Mikrotechnik, Mikroelektronik und Mikrosystemtechnik, Reise in die Mikrowelten (M. Euler/Kiel)
9. 2004: Mechanik, Resonanzen, Schwebungen und Interferenzen (O. Lührs/Berlin)
10. 2005: Wärmelehre, Die Gezeiten (W. Schneider/Erlangen)
11. 2006: Elektromagnetismus, Sport im Physikunterricht (L. Mathelitsch/Graz)
12. 2007: Optik, Mädchen im Physikunterricht (R. Wodzinski/Kassel)
13. 2008: Laser im Physikunterricht, Medizin (H. Wiesner/München)
14. 2009: Physik im Alltag, Energie und Klima, Astronomie (Th. Bürke / Schwetzingen)
15. 2010: High speed-slow motion: Experimente unter der Lupe, Physik in der Primarstufe (Welzel/Heidelberg)
16. 2011: Mechanik, Physik im Film (Müller/Braunschweig)
17. 2012: Wärmelehre, Astronomie (Lotze/Jena)
18. 2013: Elektromagnetismus, Wasserdichtigkeit von Textilien (Suhr/ Münster)
19. 2014: Optik, Neue Experimente, Physik mit dem Smartphone (Wöste, Wilhelm)
20. 2015: Freihandexperimente, Einfache astronomische Beobachtungen (Steinrücken)

Regional in Berlin and Brandenburg

Physics teacher training courses with talks in the Magnushaus/Berlin (Thursday, Friday) and practical work in a school (Saturday). Organized together with L. Wöste, W. Eberhard and Ch. Strube from Berlin. Typically 100 teachers attend from both states. Funding: Wilhelm und Else Heraeus-foundation.

04/2018: Klima und Energie

05/2019: Licht (incl. a talk by Nobel Prize winner Th. Hänsch)

05/2020: Astronomie und Astrophysik (planned)

Public Talks

at the University of Applied Sciences Brandenburg

- Von Sonnenhunden und Brockengespenst
- Licht, Musik und Sinnestäuschung
- Kometen
- Treibhauseffekt, Ozonloch und Ozonsmog
- Ton, Klang Geräusch - eine experimentelle Einführung in die Welt des Schalls
- Lassen Sie sich überraschen: ein Potpourri physikalischer Experimente
- Totale Sonnenfinsternis in Deutschland
- Lichtspiele in der Luft - optische Phänomene der Atmosphäre
- Die Sonnenfinsternis vom 29.03.2006 in der Türkei
- Die Rückkehr der Physiker Unterhaltsame Experimente am laufenden Band Audimax FHB
- Was haben Klimawandel, Treibhauseffekt und regenerative Energien miteinander zu tun
- Öffentliche Weihnachtsvorlesung Unterhaltsame Experimente am laufenden Band
- Weihnachtsvorlesung Unterhaltsame Experimente am laufenden Band
- Naturwissenschaft auf Banknoten

on stage of the theater in Brandenburg

- Es gibt mehr zu sehen als die Augen wahrnehmen
- Was Sie schon immer über Ihre Mikrowelle wissen wollten
- Physik im Rampenlicht Unterhaltsame Experimente am laufenden Band

in other universities, schools, museums, planetariums etc.

- Luftspiegelungen
- Lichtstreuung und Himmelsfarben

- Atmosphärische Optik
- Experimente zur Haushaltsmikrowelle
- Wärmestrahlung, der Blick ins Unsichtbare (Es gibt mehr zu sehen als unsere Augen wahrnehmen)
- Experimente zur Physik Einsteins (für die Grundschule)
- Physics für Nonscientists

- PicoQuant (Adlershof)
- SenTech (Adlershof)
- Fraunhofer Institut für Physikalische Messtechnik (Freiburg)
- Institut für angewandte Gewässerökologie (Seddin)
- Sacher-Lasertechnik (Marburg)
- Johanna Solar (Bosch, Brandenburg)
- Solarion AG (Leipzig)
- Fraunhofer IZM (Berlin)
- Bundesamt für Strahlenschutz (Berlin)
- PTB (Berlin)
- OSRAM GmbH (Berlin)
- Schäfter und Kirchhoff GmbH (Hamburg)

Alle öffnen Alle schließen