



## List of Publications, Patent Applications, and Talks

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### Monographs and edited volumes

1. U. Wittrock, *Feldstrukturen, thermooptische Effekte und Wirkungsgrade von Festkörper-Rohrlasern*, dissertation (Shaker-Verlag, Aachen, 1994).
2. U. Wittrock, ed., *Proceedings of the 4th International Workshop on Adaptive Optics for Industry and Medicine* (Springer-Verlag, Heidelberg, 2005).
3. U. Wittrock, U. Kynast, T. Jüstel, and M. Bredol, eds., *6th Laser Ceramics Symposium*, Optical Materials **34** (6), 935-1002 (Elsevier, 2012).

### Papers in Peer-Reviewed Journals and Conference Proceedings

1. U. Wittrock, B. Eppich, and H. Weber, "Inside-pumped Nd:YAG tube laser," Opt. Lett. **16**, 1092-1094 (1991).
2. N. Hodgson, Q. Lü, S. Dong, B. Eppich, and U. Wittrock, "Hochleistungs-Festkörper-Laser in Stab-, Slab- und Rohrgeometrie," Laser und Optoelektronik **23** (3), 82-92 (1991).
3. U. Wittrock, "High-power Nd:YAG lasers," Advanced Materials **4**, 295 (1992).
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5. U. Wittrock, M. Kumkar, and H. Weber, "Coherent radiation fields with purely radial or azimuthal polarization," in *Proceedings of the Workshop on Laser Beam Characterization*, P.M. Mejías, H. Weber, R. Martínez-Herrero, and A. González-Ureña, eds., 41 (Sociedad Española de Optica, Madrid 1993).
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7. H. Weber, U. Wittrock, S. Dong, Q. Lü, and M. Kumkar, "High average power lasers with unstable resonators and high average power Q-switched lasers," in *Proceedings of the International Meeting of the EUREKA HPSSL*, Project EU226, Budapest (1994).
8. U. Wittrock, G. Bostanjoglo, S. Dong, B. Eppich, Th. Haase, Q. Lü, N. Müller, and O. Holst, "High-power solid state lasers with improved beam quality," in *High-Power Gas and Solid State Lasers*, Vienna, M. Bohrer, T. Letardi, D. Schuoecker, H. Weber, eds., Proc. SPIE **2206**, 396 (1994).

9. B. Eppich, H. Weber, and U. Wittrock, "Beam quality of unstable and aberrated resonators," *invited*, in *Proceedings of the International Conference on Lasers '94*, Quebec, Canada, V. J. Corcoran and T. A. Goldman, eds., paper TN1 (1994).
10. U. Wittrock, S. Dong, B. Eppich, Q. Lü, N. Müller, and H. Weber, "Beam parameter products of unstable resonators," in *Beam Control, Diagnostics, Standards, and Propagation* (part of Photonics West 1995), L. W. Austin, A. Giesen, D. H. Leslie, eds., Proc. SPIE **2375**, 172-183 (1995).
11. Q. Lü, U. Wittrock, and S. Dong, "Photoelastic effects in Nd:YAG rod and slab lasers," *Optics & Laser Technology* **27**, 95 (1995).
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13. I. Buske and U. Wittrock, "Simulation of optical resonators with aberrations," in *Proceedings of the 2<sup>nd</sup> International Workshop on Adaptive Optics for Industry and Medicine*, G. Love, ed., 155-162 (World Scientific, London, 1999).
14. I. Buske, H.-M. Heuck, and U. Wittrock, "Master-oscillator-power-amplifier laser with adaptive aberration correction," in *Proceedings of the 3<sup>rd</sup> International Workshop on Adaptive Optics for Industry and Medicine*, S. R. Restaino and S. W. Teare, eds., 49-54 (Starline Printing Inc., Albuquerque, USA, 2002).
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17. H. Zimer, B. Langer, U. Wittrock, F. Heine, U. Hildebrandt, S. Seel, and R. Lange, "Novel, compact, and simple Nd:YVO<sub>4</sub> laser with 12 W of CW optical output power and good beam quality," in *Proceedings of the 5<sup>th</sup> Internat. Conference on Space Optics (ICSO)*, B. Warmbein, ed., ESA SP-554, 643-647 (European Space Agency, 2004).
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21. H.-M. Heuck, I. Buske, U. Buschmann, H. Krause, and U. Wittrock, "A novel micro-processor-controlled high-voltage driver for deformable mirrors," in *Proceedings of the 4<sup>th</sup> International Workshop on Adaptive Optics for Industry and Medicine*, U. Wittrock, ed., 73-81 (Springer, Heidelberg, 2005).
22. H.-M. Heuck, C. Häfner, S. Borneis, E. Gaul, T. Kühl, P. Wiewior and U. Wittrock, "Wavefront measurement and adaptive optics at the PHELIX laser," in *Proceedings of the 4<sup>th</sup> International Workshop on Adaptive Optics for Industry and Medicine*, U. Wittrock, ed., 283-290 (Springer, Heidelberg, 2005).

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27. K. Albers and U. Wittrock, "Novel concept for a 0.5-J laser pump source with high electro-optical efficiency," in *Proceedings of the 6<sup>th</sup> International Conference on Space Optics (ICSO)*, Noordwijk, Netherlands, A. Wilson, ed. (European Space Agency, 2006).
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33. U. Wittrock, "Laryngeally echolocating bats," *Brief Communication Arising, Nature* **466**, E6 (2010).
34. S. Verpoort and U. Wittrock, "Unimorph deformable mirror for telescopes and laser applications in space," in *Proceedings of the 8<sup>th</sup> International Conference on Space Optics (ICSO)*, Rhodes Island, Greece (2010).
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43. O. S. Kazasidis and U. Wittrock, "Interferometric measurement of the temperature coefficient of the refractive index  $dn/dT$  and the coefficient of thermal expansion of Pr:YLF laser crystals," *Opt. Expr.* **22**, 30683-30696 (2014).
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49. C. Vorholt and U. Wittrock, "Intra-cavity pumped Yb:YAG thin-disk laser with 1.74% quantum defect," *Opt. Lett.* **40**, 4819-4822 (2015).
50. P. Rausch, S. Verpoort, and U. Wittrock, "Unimorph deformable mirror for space telescopes: environmental testing," *Opt. Expr.* **24**, 1528-1542 (2016).
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53. G. Durand, J. Amiaux, M. Sauvage, J Austin, S. Chesne, C. Collette, S. Helgouashl, J. Pareschi, Y. Penfornis, G. Valsecchi, and U. Wittrock, "TALC a far-infrared 20m space telescope and the ELICSIR consortium to reach TRL 3," in *Proceedings of the 37th ESA Antenna Workshop*, Noordwijk, Netherlands (2016).
54. C. Vorholt and U. Wittrock, "Single-frequency oscillation of thin-disk lasers due to phase-matched pumping," *Opt. Expr.* **25**, 21388-21399 (2017).
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58. O. Kazasidis, S. Verpoort, and U. Wittrock, "Aberration balancing using an image-sharpness metric," *J. Opt. Soc. Am. A* **36**, 1418-1422 (2019).
59. O. Kazasidis, S. Verpoort, and U. Wittrock, "Sensor for dynamic focus control of a deformable mirror," *Appl. Opt.* **59**, 5625-5630 (2020).
60. S. Verpoort, M. Bittner, and U. Wittrock, "Fast focus-shifter based on a unimorph deformable mirror," *Appl. Opt.* **59**, 6959-6965 (2020).
61. S. Trinschek, C. Vorholt, and U. Wittrock, "Nonlinear dynamics in intra-cavity pumped thin-disk lasers," *Opt. Expr.* **29**, 5755-5773 (2021).
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63. S. Leitz, M. Gerhards, S. Verpoort, U. Wittrock, M. Freudling, A. Grzesik, M. Erhard, and P. Hallibert, "Vibration and shock testing of a 50 mm aperture unimorph deformable mirror," *International Conference on Space Optics (ICSO)*, virtual, poster and proceedings, P140 (2021).
64. M. Freudling, A. Grzesik, M. Erhard, S. Leitz, S. Verpoort, and U. Wittrock, "Space-qualified piezo based deformable mirror for future Instruments with active optics," *International Conference on Space Optics (ICSO)*, virtual, Proc. SPIE **11852**, 1185231-11 (2021).
65. I. Alonso et al, "Cold atoms in space: community workshop summary and proposed road-map," *EPJ Quantum Technology* **9** (2022).
66. T. Fiehler and U. Wittrock, "17 GHz Kerr-lens mode-locked monolithic Ti:sapphire laser," submitted to: *Advanced Solid State Lasers Conference (ASSL)*, Osaka, Japan, 20 - 25 October, 2024
67. T. Fiehler and U. Wittrock, "A pitfall in autocorrelation measurements of laser radiation," submitted to: *Optics Express*, [doi: 10.1364/opticaopen.26097352](https://doi.org/10.1364/opticaopen.26097352).



## Other Publications and Awards

1. S. Borneis, H. Balonier, R. Bock, E. Brambrink, H. Brand, C. Bruske, J. Caird, E. W. Gaul, W. Geithner, S. Götte, C. Häfner, T. Hahn, W. Heddrich, H. M. Heuck, D. H. H. Hoffmann, D. Javorkova, H.-J. Kluge, T. Kühl, S. Kunzer, T. Merz, P. Neumayer, D. Reemts, M. Roth, S. Samek, G. Schaumann, F. Schrader, W. Seelig, C. Spielmann, A. Tauschwitz, R. Thiel, D. Ursescu, P. Wiewior, and U. Wittrock, "Status of PHELIX laser program," in *GSI Scientific Report 2003*, Gesellschaft für Schwerionenforschung, Darmstadt, 120-121 (2004).
2. H.-M. Heuck, S. Borneis, E. Gaul, C. Häfner, A. Kudryashov, T. Kühl, P. Wiewior, and U. Wittrock, "Beam diagnostics and adaptive optics for PHELIX," in *GSI Scientific Report 2003*, Gesellschaft für Schwerionenforschung, Darmstadt, 124 (2004).
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4. V. Bagnoud, A. Blazevich, R. Bock, S. Borneis, H. Brand, C. Bruske, J. Caird, U. Eisenbarth, J. Fils, R. Fuchs, S. Götte, M. Hagemann, T. Hahn, H.-M. Heuck, C. Hildebrandt, D. H. H. Hofmann, D. Javorkova, H.-J. Kluge, F. Knobloch, Th. Kühl, S. Kunzer, M. Kreutz, R. Lotz, T. Merz, P. Neumayer, E. Onkels, D. Reemts, M. Roth, H. Schmidt, C. Spielmann, R. Stenner, A. Tauschwitz, R. Thiel, U. Thiemer, D. Ursescu, K. Witte, U. Wittrock, and B. Zielbauer, "PHELIX progress report," in *GSI Scientific Report 2005*, Gesellschaft für Schwerionenforschung, Darmstadt, 356-358 (2006).
5. K. Witte, V. Bagnoud, A. Blazevic, S. Borneis, C. Bruske, J. Caird, S. Calderon, U. Eisenbarth, J. Fils, R. Fuchs, S. Götte, T. Hahn, H.-M. Heuck, C. Hildebrandt, D. H. H. Hoffmann, D. Javorkova, G. Klappnich, J. Kluge, F. Knobloch, T. Kühl, M. Kugler, S. Kunzer, M. Kreutz, B. LeGarrec, R. Lotz, T. Merz-Mantwill, E. Onkels, S. Radau, D. Reemts, R. M. Richard, M. Roth, A. Roussel, R. Stenner, A. Tauschwitz, R. Thiel, U. Thiemer, D. Ursescu, U. Wittrock, and B. Zielbauer, "PHELIX Progress Report 2006," in *GSI Scientific Report 2006*, Gesellschaft für Schwerionenforschung mbH, Darmstadt, 291-293 (2007).
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7. H. Heuck, P. Neumayer, M. Hagemann, K. Witte, T. Kühl, and U. Wittrock, "Chromatic aberration at PHELIX," in *GSI Scientific Report 2006*, Gesellschaft für Schwerionenforschung mbH, Darmstadt, 295 (2007).
8. R. Köjer, P. Welp, S. Verpoort, H.-M. Heuck, K. Albers, and U. Wittrock, "Adaptive Optik für Festkörperlaser," in *InnovationsForum Photonik*, Posterwettbewerb 2007, award for research accomplishments with a perspective for practical applications, Goslar (2007).
9. K. Witte, V. Bagnoud, A. Blazevic, S. Borneis, C. Bruske, J. Caird, S. Calderon, U. Eisenbarth, J. Fils, S. Götte, H. M. Heuck, D. H. H. Hoffmann, D. Javorkova, G. Klappich, F. Knobloch, Th. Kühl, M. Kugler, S. Kunzer, M. Kreutz, B. LeGarrec, T. Merz-Mantwill, E. Onkels, S. Radau, M. Rebscher, D. Reemts, R. M. Richard, M. Roth, A. Roussel, A. Tauschwitz, An. Tauschwitz, R. Thiel, U. Thiemer, D. Ursescu, U. Wittrock, B. Zielbauer, and D. Zimmer, "PHELIX - Achievements in 2007," in *GSI Scientific Report 2007*, Gesellschaft für Schwerionenforschung mbH, Darmstadt (2008).
10. U. Wittrock, "Grenzen? Welche Grenzen? Prof. Ulrich Wittrock, Leiter des Labors für Photonik an der Fachhochschule Münster, fragt nach den ultimativen Grenzen der Lasertechnik," *Laser Community - das Lasermagazin von Trumpf*, Vol. 02:14 (2014).

11. U. Wittrock, "Limitations? What Limitations? Prof. Ulrich Wittrock, head of the Photonics Laboratory at the Münster University of Applied Sciences, seeks out the ultimate boundaries of laser technology," Laser Community - the laser magazine from Trumpf, Vol. 02:14 (2014).
12. O. Kazasidis and U. Wittrock, "Interferometric measurement of the temperature coefficient of the refractive index  $dn/dT$  and the coefficient of thermal expansion of Pr:YLF laser crystals: erratum," Opt. Expr. **23**, 24097 (2015).
13. C. Vorholt and U. Wittrock, "Wavelength control by angle-tuning of the laser radiation in an intra-cavity pumped Yb:YAG thin-disk laser," awarded in: ASSL Best Student Oral and Poster Presentations - IPG Best Students Poster Presentations (2015).

### Patent Applications / Patents

1. U. Wittrock, *Vorrichtung zum optischen Pumpen von Festkörperlasern mit Hilfe von Fluoreszenzkonvertern*, German Patent Application DE 4021423 A1 (1990).
2. U. Wittrock, Festkörperlaseranordnung (Slab-Laser), German Patent Application DE 4428968 A1 (1994).
3. Q. Lü and U. Wittrock, Laseranordnung zur Kompensation der Doppelbrechung und Bifokussierung in Lasermedien, German Patent DE 441551 B4 (application 1994, issued 2006).
4. U. Wittrock, Faserlaser mit einer Faser als aktivem Material und einer Pumplichtquelle zum optischen Pumpen der Faser, German Patent Application DE 19635608 A1 (1996).
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9. U. Wittrock, Solid-state laser amplifier, US Patent US 6,944,196 B2 (application 2003, issued 2005), European Patent EP 1 333 547 B1 (application 2003, issued 2006).
10. U. Wittrock, K. Petermann, Mehrschichtiges Lasermedium, German Patent DE 102007048463 B4 (application 2007, issued 2009).
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### Talks

1. U. Wittrock, J. Eicher, and N. Hodgson, "Efficiency, thermal stress, and thermal lensing of a solid state tube laser," presented at the Fourth International Meeting of the EUREKA HPSSL Project EU226, Paris (1989).
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### Supervised Ph. D. Theses\*

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\*) Muenster University of Applied Sciences does not grant Ph. D. degrees. The research for the listed dissertations was performed at the Photonics Laboratory at Muenster University of Applied Sciences. However, the Ph. D. degrees were granted by cooperating universities.

### Externally Reviewed Ph. D. Theses

1. M. Kahle, "Entwicklung eines hocheffizienten Lasersystems mit minimalen thermischen Effekten," dissertation, Friedrich-Schiller-Universität Jena, 2017.
2. J. Pilař, "Adaptive optics for high average-power laser systems," dissertation, Czech Technical University of Prague, 2017.

3. H. Liebetrau, "Erzeugung und zeitliche Streckung kontrast-optimierter Seed-Pulse für Hochintensitätslaser bei 1030 nm," dissertation, Friedrich-Schiller-Universität Jena, 2017.