

Literature

Laser, LED and Lamp-Safety

Test House and Consulting

<http://laser-led-lamp-safety.seibersdorf-laboratories.at>

As of June 2015

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Books published by Seibersdorf Laboratories Publishing

Rechtsvorschriften für Hersteller von Produkten

Karl Schulmeister, Seibersdorf Laboratories Publishing, Seibersdorf, 3. Auflage; 2013, ISBN 978-3-902780-02 (Print); ISBN 978-3-902780-03 (e-book)

Books

Laser Safety

Roy Henderson and Karl Schulmeister
Taylor & Francis Group, New York, London, 2004

WHO ICNIRP Guide - Protecting workers from ultraviolet radiation

Breitbart E, Césarini JP, de Gruijl F, Diffey B, Hietanen M, Mariutti G, McKinlay A, Okuno T, Roy C, Schulmeister K, Sliney D, Söderberg P, Stuck B, Swerdlow A, van Deventer E, Zeeb H
World Health Organisation, Geneva, 2007

Book Chapters

Critical Fields-of-View and Entrance Aperture in Hazard Evaluations

Karl Schulmeister

In: „Measurement of Optical Radiation Hazards“, ICNIRP, CIE, München 1998, pages 573-588

(A Reference Book on Presentations Given by Health and Safety Experts on Optical Radiation Hazards, Gaithersburg, Maryland, USA. 1-3 September 1998)

Laser Guidelines on Limiting Exposure

Karl Schulmeister

In: Executive Summary of the 4th International Non-Ionizing Radiation Workshop, Kyoto, May 20-25th 2000

Editors: R. Matthes, J.H. Bernhardt, M. Taki, ICNIRP 2000 Oberschleißheim Germany.
Pages 95-98

Radiation

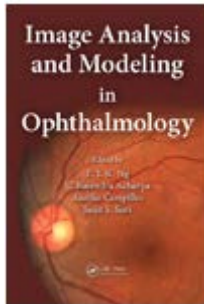
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in: *Industrial Laser Safety Handbook*, Schröder K. ed, ARGELAS Vienna, 2002

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in: *Industrial Laser Safety Handbook*, Schröder K. ed, ARGELAS Vienna, 2002



Jean M and Schulmeister K

Modeling of Laser-Induced Thermal Damage to the Retina and the Cornea

in: Image Analysis and Modeling in Ophthalmology, Chapter 15, Ed.: E. Y. K. Ng, U. Rajendra Acharya, Jasjit S. Suri, and Aurelio Campilho, CRC Press 2014

Print ISBN: 978-1-4665-5930-1

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Chapter link

<http://www.crcnetbase.com/doi/abs/10.1201/b16510-16>

Guidelines

Zentrales Arbeitsinspektorat Leitfaden: Künstliche Optische Strahlung

Josef Kerschhagl, Karl Schulmeister, Emmerich Kitz, Walter Rauter, Matthias Chadim, März 2013

ICNIRP Guidelines on limits of exposure to incoherent visible and infrared radiation

P. Söderberg, B. Stuck, D. Sliney, K. Schulmeister, B. Lund, R. Thomas

Health Physics 105(1):74-91; July 2013

ICNIRP Guidelines on limits of exposure to laser radiation of wavelengths between 180 nm and 1,000 μm

P. Söderberg, B. Stuck, R. Greinert, D. Sliney, K. Schulmeister, B. Lund, R. Thomas

Health Physics 105(3):271-295; Sept 2013

Papers

For each topic, the papers are listed according to publication date – most recent first

Laser Safety

NOTE: See also papers in section „Bioeffects, Exposure Limits and Risk“

Analysis of pulsed emission under Edition 3 of IEC 60825-1

Karl Schulmeister

ILSC 2015 Proceedings Paper #202, Page 78-84

Classification of extended source products according to IEC 60825-1

Karl Schulmeister

ILSC 2015 Proceedings Paper #C101, Page 271-280

Challenges in the Protection against Optical Radiation Hazards,

Karl Schulmeister

IRPA 2014 Geneva, Abstract Book P6-2, Page 311 (2014)

On the exposure limits for extended source multiple pulse laser exposures

Brian J. Lund and Karl Schulmeister

J. Laser Appl. 25, Paper 042004 (2013)

The upcoming new editions of IEC 60825-1 and ANSI Z136.1 – Examples on impact for classification and exposure limits

Karl Schulmeister

ILSC 2013 Proceedings Paper #C102, p 330 – 337

Risk analysis relevant for laser products under IEC 60825-1

Karl Schulmeister

ILSC 2013 Proceedings Paper #601, p163-172

Regulations regarding the sale and use of Class 3R laser products in Europe

Karl Schulmeister

ILSC 2013 Proceedings Paper #P110, p 379 - 383

The widely varying risk from Class 3R laser products in light of the revision of IEC 60825-1

Karl Schulmeister

ILSC 2011 Paper 103, p.72-75

Present and alternative dosimetry concept for laser exposure limits

Karl Schulmeister

Medical Laser Application 25 (2010), pp. 111-117

Influence of magnifiers on ocular exposure levels

Georg Vees, Reinhard Gilber and Karl Schulmeister
ILSC 2009 Proceedings, p 129 – 138

Damage thresholds for irregularly pulsed exposure of the retina

Karl Schulmeister and Johannes Husinsky
ILSC 2009 Proceedings, p 88 – 92

Damage thresholds for scanned exposure of the retina

Karl Schulmeister, Bernhard Seiser, Johannes Husinsky, Mathieu Jean, Beate Fekete, Letizia Farmer
ILSC 2009 Proceedings, p79 - 83

Proposed changes for the retinal thermal MPE

Karl Schulmeister, Bruce Stuck, David J Lund and David H Sliney
ILSC 2007 Conference Proceedings, LIA, p 121 - 127

Comparison of different beam diameter definitions to characterize thermal damage of the eye

Karl Schulmeister, Reinhard Gilber, Florian Edthofer, Bernhard Seiser, and Georg Vees
Proc. SPIE 6101 “Laser Beam Control and Applications”, 61011A (2006)

Aktuelle Entwicklungen bei der Lasernormung

Karl Schulmeister
Tagungsdokumentation Optische Strahlung – EU-Richtlinie und aktuelle Forschungsergebnisse, Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund 2005, p. 57 – 66

Eye simulating scheme for a complete characterization of the retinal hazard of LEDs

Karl Schulmeister
Proceedings of the CIE Expert Symposium “LED Light Sources “, ISBN 3 901 906 36 3, CIE Vienna, CIE x026:2005, CDROM p. 60 - 64

‘The Apparent Source’ – A Multiple Misnomer

Karl Schulmeister
ILSC March 2005 Los Angeles, ISBN 0-912035-79-X, Laser Institute of America, p. 91-98

Principles for consistent application of the IEC laser product safety standard based on legal requirements

Karl Schulmeister Georg Vees
ILSC March 2005 Los Angeles, ISBN 0-912035-79-X, Laser Institute of America, p 111-120

The dependence of the apparent source on exposure position

Karl Schulmeister
SPIE Proceedings Vol 5688B, Laser and Noncoherent Light Ocular Effects: Epidemiology, Prevention, and Treatment, San Jose 2005, Ed. B. E. Stuck and M. B. Belkin, p 401 - 410.

Criteria for the determination of the ‘thermal’ retinal spot diameter

Karl Schulmeister, Bernhard Seiser, Florian Edthofer, Ulfried Grabner, Georg Vees
SPIE Proceedings Vol 5688B, Laser and Noncoherent Light Ocular Effects: Epidemiology, Prevention, and Treatment, San Jose 2005, Ed. B. E. Stuck and M. B. Belkin, p 458 - 468.

Beam propagation model for laser hazard evaluations including optical instruments

Karl Schulmeister, Sandra Althaus, Ulfried Grabner, Georg Veas

NIR 2004, 36. Jahrestagung des Fachverbandes für Strahlenschutz, Köln, Deutschland, 31.08 – 02.09.04, Proceedings p 803 – 806, Band II, ISSN 1013-4506

Beam propagation model for the hazard evaluation of Gaussian laser beams

Karl Schulmeister, Sandra Althaus, Ulfried Grabner, Georg Veas

NIR 2004, 36. Jahrestagung des Fachverbandes für Strahlenschutz, Köln, Deutschland, 31.08 – 02.09.04, Proceedings p 793 – 802, Band II, ISSN 1013-4506

Generelles Konzept zur Gefährdungsbeurteilung und zur Bestimmung der scheinbaren Quelle bei Laser und optischer Strahlung

Karl Schulmeister, Sandra Althaus, Ulfried Grabner, Georg Veas

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Klasse 1 bei Lasergeräten – nett, aber nicht notwendig

Georg Veas, Karl Schulmeister

NIR 2004, 36. Jahrestagung des Fachverbandes für Strahlenschutz, Köln, Deutschland, 31.08 – 02.09.04, Proceedings p 659 – 666, Band II, ISSN 1013-4506

Maximising Optical Emission under the International Laser and LED Safety Standard

Karl Schulmeister

In: Photonics in Measurement, VDI Bericht 1844, p 389 – 399, VDI Frankfurt 2004
ISBN 3-18-091844-6

Laser and LEDs – The Technology and its Applications

Karl Schulmeister

Invited Lecture, International NIR Workshop & Symposium, Seville 20-22 May 2004, ICNIRP Proceedings, Session 6a, p1-26, ISBN 3-93499404-0

Location and size of the apparent source for laser and optical radiation ocular hazard evaluation

Karl Schulmeister, Sandra Althaus, Ulfried Grabner and Georg Veas

Paper 8c6, p1-9, Proceedings IRPA 11, Madrid 2004, ISBN 84-87078-05-2

Beam Propagation Hazard Calculations for Telescopic Viewing of Laser Beams

Ulfried Grabner, Georg Veas and Karl Schulmeister

Proceedings ILSC 2003, LIA, p 116-125

Concepts of Probabilistic Risk Analysis and Applicability for “Day-to-Day” Laser Safety Evaluations

Karl Schulmeister, Georg Veas, David Sliney

Proceedings ILSC 2003, LIA, p 111-115

Safety Classification of Laser Products Following the New Edition of IEC 60825-1

Karl Schulmeister

Book of Abstracts, „Lasers in Manufacturing“, June 18-20 2001 Munich, page 147 – 148, WLT, Hannover 2001

Optical Properties of Binoculars and Telescopes Relevant to Laser Safety

Karl Schulmeister, Herbert Hödlmoser, Helmut Schön and Volker Stübler

Technical Digest ILSC 200, Laser Institute of America, March 5-8, 2001 San Diego p. 81-84

Concepts in dosimetry related to laser safety and optical radiation hazard evaluation

K. Schulmeister

SPIE Vol. 4246, Proceedings of Laser and Noncoherent Light Ocular Effects: Epidemiology, Prevention, and Treatment III, pp 104-116, San Jose 2001, Ed. B. E. Stuck and M. B. Belkin.

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Karl Schulmeister (invited)

Fachverband für Strahlenschutz 31. Jahrestagung NIR 99, Köln 1999, TÜV Verlag Köln, Seiten 401-420

Interactive Multimedia Programming Allows Laser Safety Training to Be Adapted to User's Specific Needs

Karl Schulmeister, Darrell Seeley, Harald Bauer, Peter Koger

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Measurement of Optical Radiation to Assess the Blue Light Hazard

Karl Schulmeister, Martina Schwaiger, Georg Vees, Christian Schmitzer

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UV-Radiation Induced Ozone and Nitrogen Oxide Emission during CO₂ Laser Welding

K. Schröder, K. Schulmeister, and G. Liedl

Proc. of Industrial Laser Safety Forum, 317, Copenhagen 1995

Die internationale Lampensicherheitsnorm

Karl Schulmeister

Strahlenschutz aktuell, 44. Jahrgang Heft 1, s 28 - 36, Wien, 2010

Revision of the international safety limits for optical radiation

Karl Schulmeister

Proceedings of CIE 2010 "Lighting Quality and Energy Efficiency", p 842-844; Vienna, 2010

Safety Classification of LEDs and lamps according to EN 62471:2008 and in relation to the EU Optical Radiation Directive

M. Weber, K. Schulmeister, G. Veas, E. Kitz, H. Brusl

Proceedings "Light and Lighting 2009" Budapest

Die neue Sicherheitsnorm für Lampen: IEC 62471

Marko Weber, Karl Schulmeister

Lichttechnische Fachtagung 2007, Wien, Lichttechnische Gesellschaft Österreichs, Seiten 31 – 45

Broad-band Radiation Exposure Limits and International Lamp Safety Standards

Karl Schulmeister, Marko Weber

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Practical Measurement Issues and Uncertainties for Spectral and Integral Methods

Karl Schulmeister

CIE Expert Symposium "Light and Health" – Tutorial: Light Measurement for Photobiology; Wien, 29.09.2004; Tutorial Handout p 31-33

Praktische Anwendung der internationalen CIE-Lampensicherheitsnorm

Karl Schulmeister, Marko Weber

Licht 2004, 16. Gemeinschaftstagung der Lichttechnischen Gesellschaften Deutschlands, der Niederlande, Österreichs und der Schweiz, Dortmund, Deutschland, 19.09. – 22.09.04, Proceedings p 104

Risiko-Klassifizierung gemäß der internationalen CIE Lampensicherheitsnorm

Marko Weber, Karl Schulmeister

NIR 2004, 36. Jahrestagung des Fachverbandes für Strahlenschutz, Köln, Deutschland, 31.08 – 02.09.04, Proceedings p 940 – 954, Band II, ISSN 1013-4506

Potentielle Gefährdung der Augen und Haut durch Infrarotwärmekabinen

Karl Schulmeister, Marko Weber

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Photobiological Hazards of Infrared Warming Cabins

Karl Schulmeister

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Hazard Assessment of LEDs by different Safety Standards

Marko Weber, Ulfried Grabner, Karl Schulmeister,

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Hazard Assessment of Lamps Following the New CIE Lamp Safety Standard

Karl Schulmeister and Marko Weber

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Bioeffects, Exposure Limits and Risk

Biophysical data in support of the classification distance for image projectors under IEC 62471-5

Karl Schulmeister, Jan Daem

ILSC 2015 Proceedings Paper #301, Page 96-105

Temperature controlled in vivo ocular exposure to 1090 nm radiation suggests that near IRR cataract is thermally induced

Zhaohua Yu, Karl Schulmeister, Nooshin Talebizadeh, Martin Kronschläger, Per Söderberg
J Biomed Opt. 20(1):15003. (2015) doi: 10.1117/1.JBO.20.1.015003.

Validation of a computer model to predict laser induced thermal injury thresholds of the retina

Mathieu Jean and Karl Schulmeister

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Computer modeling of laser induced injury of the skin

Mathieu Jean and Karl Schulmeister

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Near infrared ex-vivo bovine and computer model thresholds for laser-induced retinal damage

Karl Schulmeister, Rahat Ullah and Mathieu Jean

Photonics & Lasers in Medicine 1(2), 123-131; 2012

Review of thresholds and recommendations for revised exposure limits for laser and optical radiation for thermally induced retinal injury

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Manifestations of the Strong Non-Linearity of Thermal Injury

Karl Schulmeister, Mathieu Jean

ILSC 2011 Paper 901, p. 201-204

Modelling of laser induced injury of the cornea

Karl Schulmeister, Mathieu Jean

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The widely varying risk from Class 3R laser products in light of the revision of IEC 60825-1

Karl Schulmeister

ILSC 2011 Paper 103, p.72-75

The risk of retinal injury from Class 2 and visible Class 3R lasers, including medical laser aiming beams

Karl Schulmeister, Mathieu Jean

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K Schulmeister, J Husinsky, B Seiser, F Edthofer, B Fekete, L Farmer, D J Lund
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Review of exposure limits and experimental data for corneal and lenticular damage from short pulsed UV and IR laser radiation

Karl Schulmeister, David H. Sliney, John Mellerio, David J. Lund, Bruce E. Stuck, Joseph A. Zuclich
Journal Laser Applications, Vol 20 (2008) p 98 - 105

In vivo high power infrared radiation exposure time dependence of lens light scattering

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Retinal thermal laser damage thresholds for different beam profiles and scanned exposure

Karl Schulmeister, Reinhard Gilber, Bernhard Seiser, Florian Edthofer, Johannes Husinsky, Beate Fekete and Letizia Farmer
Ophthalmic Technologies XVIII, Proc. Of SPIE Volume 6844, Paper 68441L, Pages 68441L-1 to 68441L-12

Variation of Laser-induced retinal injury thresholds with retinal irradiated area: 0.1 s duration, 514 nm exposures

David J. Lund, Peter Edsall, Bruce E Stuck and Karl Schulmeister
Journal Biomedical Optics 12, 024023 (2007)

Retinal thermal damage threshold studies for multiple pulses

Karl Schulmeister, Bernhard Seiser, Florian Edthofer, Johannes Husinsky and Letizia Farmer
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Modelling of the laser spot size dependence of retinal thermal damage

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Laser-induced retinal injury thresholds: Variation with retinal irradiated area

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Second Order PRA Model for Ocular Laser Damage

Karl Schulmeister, Herbert Hödlmoser, John Mellerio and David H. Sliney
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What is the Meaning of Thresholds in Laser Injury Experiments? Implications for Human Exposure Limits

David H. Sliney, John Mellerio, Veit-Peter Gabel and Karl Schulmeister
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The Spot-Size Dependence of Pulsed-Laser Induced Retinal Injury Thresholds – Is the Dependence Real or an Artefact of Statistical Presentation?

David H. Sliney, John Mellerio, Karl Schulmeister
Proceedings Laser Bioeffects Meeting Paris June 13-14th 2002, p. 4-1 to 4-12

Probabilistic laser risk analysis: Monte Carlo simulation of the uncertainty of ED-50 and slope

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Karl Schulmeister, Gerald Sonneck, Frank Rattay, Herbert Hödlmoser, David Sliney, John Mellerio, Alain Culoma, Christian Preyssl
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K. Schulmeister, G. Sonneck, H. Hödlmoser, F. Rattay, J. Mellerio and D. Sliney
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Implications of using ED-50 and Probit analysis in comparing retinal injury threshold data

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K. Schulmeister, G. Sonneck, H. Hödlmoser, F. Rattay, J. Mellerio and D. Sliney
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Probability of Human Exposure from Space Based Lasers

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Solar UV-Radiation

Outdoor Workers' Acceptance of Personal Protective Measures against Solar Ultraviolet Radiation

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K Schulmeister, M Weber, H Brusl
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Marko Weber, Karl Schulmeister and Helmut Brusl
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Short- and long-wave ultraviolet light (UVB and UVA) induce similar mutations in human skin cells

Ulrike P. Kappes, Dan Luo, Marisa Potter, Karl Schulmeister, Thomas M. Rütger
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Charakterisierung integrierender Detektoren bezüglich Meßgenauigkeit

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Melatonin Suppression

Light Induced Melatonin Suppression – Indications for a Dose Dependence

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Light at night and cancer risk

Eva Schernhammer and Karl Schulmeister

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Application of the Melatonin Suppression Action Spectra for Lighting

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