Activities of RP Photonics

RP Photonics is active in the following areas:

- photonics marketing (through its famous website)
- simulation & design software
- technical consulting

This document tells you mostly about the technical consulting. Look at our website if you are interested in software or marketing.

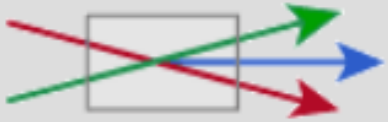
Competent Consulting Services for the Laser and Photonics Industry

Product Design, Problem Solving, Calculations and Simulations, Independent Expertise, and Staff Training on

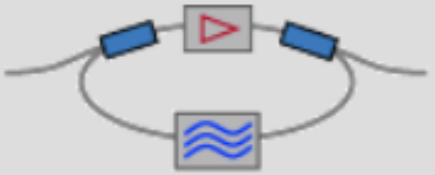
- Lasers and Amplifiers



- Nonlinear Optics



- Fiber Optics



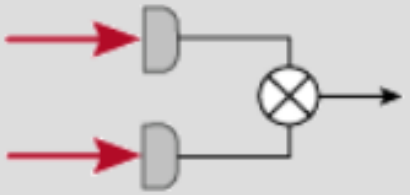
- Ultrashort Pulses



- Multilayer Optics



- Fluctuations and Noise



Overview (1)

Consulting for whom: for manufacturers of laser systems and optical components, for users of optical technology, and for high-tech investors and research funding agencies

Technical areas: lasers and amplifiers, nonlinear optics, fiber optics, ultrashort pulses, multilayer optics, fluctuations and noise

Types of services: e.g. laser design, problem analysis (trouble shooting), modeling and software development, independent comparison of products or technologies, proposal writing, working out patent applications, due diligence, and in-house staff training

Software: user licenses for simulation software made by RP Photonics are also available.

Overview (2)

Why to work with just *this* company: because of its particularly high scientific and technical competence, its commitment to consistently fair and reliable treatment of all partners, and its flexibility to quickly help in whatever way makes sense

Why to use consultancy at all: because it makes your product development faster and more cost-effective (consider time to market), expands your resources in a flexible way, raises the competence level of your team, and reduces risks by providing competent and impartial advice for critical decisions

The Company

Name: RP Photonics AG

Location: Bannhaldenstr. 38, CH-8500 Frauenfeld

Website: https://www.rp-photonics.com/

Existing since: 2004 (founded in Zürich, moved to Bad Dürrheim in 12/2010, then to Frauenfeld in 02/2022)

Tel.: +41 52 720 8000

The founder:

Dr. Rüdiger Paschotta <Paschotta@rp-photonics.com> is a distinguished expert in laser technology and related areas. He is author or coauthor of over 100 scientific articles and the only author of the well-known RP Photonics Encyclopedia.



Services for Manufacturers

- product designs, e.g. of diode-pumped lasers or frequency conversion stages
- solving technical problems (trouble shooting)
- staff training: tailored training courses, performed at the customer's location
- software: fixed packages and tailored solutions
- physical modeling
- independent (unbiased) evaluations of technologies and products
- help with proposal writing, patent applications, due diligence, etc.
- advertising: highly targeting advertising via links and banners in the RP Photonics Buyer's Guide and the RP Photonics Encyclopedia

There are also services for investors and communications experts.

Training on Laser Technology

RP Photonics provides staff training courses for companies and institutes. This is a highly efficient way of boosting a team's know-how within a short time. Some key aspects:

- The topics, level of detail and duration of a course are exactly **tailored to the customer's needs**.
- Courses can be done **at the customer's premises** – don't spend any traveling time.
- A course is also an ideal way of finding out what you can expect from the consultancy offered by Dr. Paschotta.

Dr. Paschotta also regularly performs short courses at international scientific conferences such as Photonics West, ASSP and CLEO/Europe. Examples for topics are laser beam quality, resonator design, applied nonlinear frequency conversion, modeling of fiber amplifiers and lasers and high-power lasers.

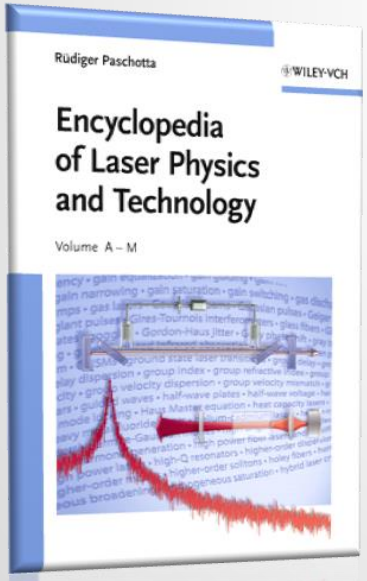
Publications

Manifold publications are useful sources of information on laser technology and also demonstrate the expertise of the founder, Dr. Rüdiger Paschotta:

- Over 100 articles appeared in refereed scientific journals (see the CV of Dr. Paschotta)
- RP Photonics Encyclopedia: see the next page
- Additional books: SPIE Field Guides on **Lasers**, **Laser Pulse generation**, and **Optical Fiber Technology**, see a later page

RP Photonics Encyclopedia

This extensive source of high-quality information on laser technology and related areas is available in open-access form in the Internet and as a two-volume book published via Wiley VCH.



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Article keyword

Encyclopedia > letter C > critical phase matching

Critical Phase Matching

Definition: phase matching of a nonlinear interaction by adjustment of a propagation direction

Alternative term: angle phase matching

More general term: phase matching

Opposite term: noncritical phase matching

German: kritische Phasenanpassung, Winkel-Phasenanpassung

Category: nonlinear optics

How to cite the article; suggest additional literature

Author: Dr. Rüdiger Paschotta

Ask RP Photonics to compute a complete list of critical phase matching configurations in your crystal, and for the calculation of all relevant parameters.

Critical phase matching (also called angle phase matching) is a technique for obtaining phase matching of some nonlinear process in a birefringent crystal. The interacting beams are aligned at some angle(s) to the axes of the index ellipsoid. In almost all cases, there are one or two waves polarized along one axis of the index ellipsoid (*ordinary beam*), while another one or two waves are polarized at some variable angle with the plane spanned by the other two axes (*extraordinary beams*). Adjustment of the propagation angle affects the refractive index of the extraordinary beam (called *extraordinary refractive index*), whereas the ordinary index stays constant. For some angular position, phase matching

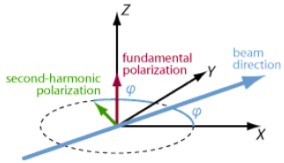
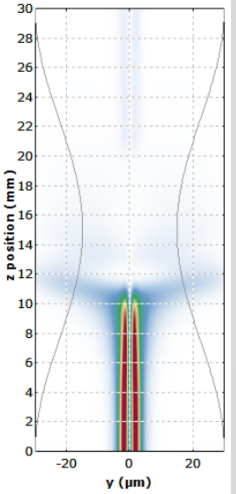


Figure 1: Critical phase matching of second-harmonic generation in LBO. The polarization directions of fundamental (red) and second-harmonic wave (green) are perpendicular to the beam direction, and to each other.

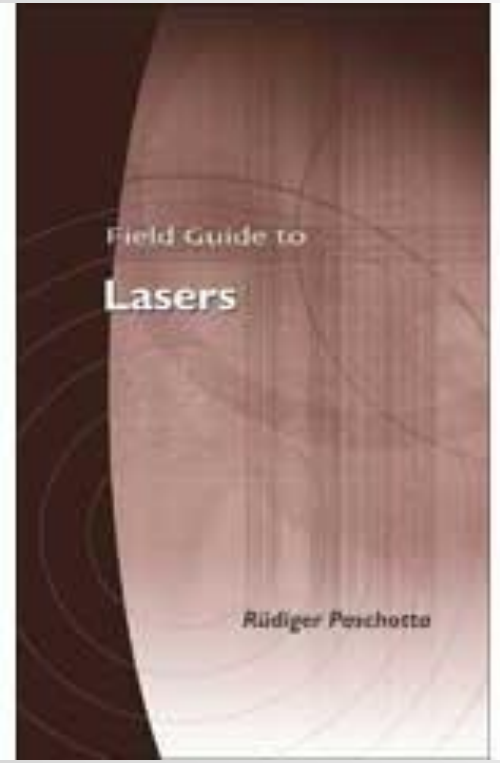


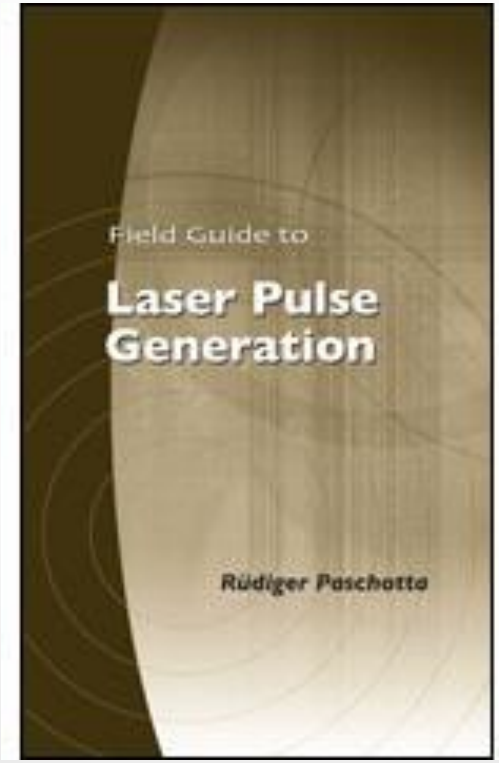
Intensity evolution of the LP_{11} mode in a tapered fiber. In the tapered region, most of the light is lost into the fiber cladding

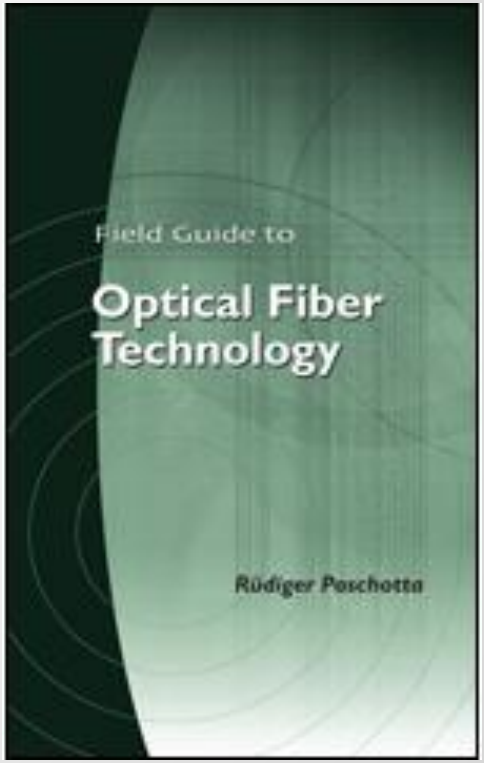
This diagram has been made with the RP Fiber Power software.

SPIE Field Guides

The **SPIE Field Guides** represent a series of handy books, which quickly introduce into certain technical topics. Dr. Paschotta has so far authored the Field Guides on **Lasers**, **Laser Pulse Generation** and **Optical Fiber Technology**, which have become quite popular.







Simulation and Design Software

RP Photonics also offers various software packages, developed by Dr. Rüdiger Paschotta for designing various types of photonics devices:

- **RP Fiber Power:** for fiber lasers and amplifiers (also usable for many bulk lasers, regenerative amplifiers etc.)
  Brochure: https://www.rp-photonics.com/RP_Fiber_Power.pdf
- **RP Resonator:** for laser resonator design
- **RP ProPulse:** for pulse propagation, particularly in mode-locked lasers
- **RP Coating:** for optical thin-film devices