

List of publications

February 2019

Paul Beaud

Paul Scherrer Institut
Forschungsstrasse 111
5232 Villigen PSI
Switzerland

Articles in Peer Reviewed Journals

- [109] **Kinetics of a phonon-mediated laser-driven structural phase transition in $\text{Sn}_2\text{P}_2\text{Se}_6$**
M. Kubli, M. Savoini, E. Abreu, B. Burganov, G. Lantz, L. Huber, M. J. Neugebauer, L. Boie, S. Grübel, V. Esposito, E. M. Bothschafter, S. Parchenko, J. Rittmann, P. Beaud, U. Staub, M. Yabashi, Y. Tanaka, T. Katayama, T. Togashi, and S. L. Johnson
Appl. Sci. (accepted).
- [108] **The ultrafast Einstein-De Haas effect**
C. Dornes, Y. Acremann, M. Savoini, M. Kubli, M. J. Neugebauer, E. Abreu, L. Huber, G. Lantz, C. A. F. Vaz, H. Lemke, E. M. Bothschafter, M. Porer, V. Esposito, L. Rettig, M. Buzzi, A. Alberca, Y. W. Windsor, P. Beaud, U. Staub, D. Zhu, S. Song, J. M. Glowina, and S. L. Johnson
Nature **565**, 209-212 (2019).
- [107] **Towards X-ray transient grating spectroscopy**
C. Svetina, R. Mankowsky, G. Knopp, F. Koch, G. Seniutinas, B. Rösner, A. Kubec, M. Lebugle, I. Mochi, M. Beck, C. Cirelli, J. Krempasky, C. Pradervand, J. Rouxel, G. Mancini, S. Zerdane, B. Pedrini, V. Esposito, G. Ingold, U. Wagner, U. Flechsig, R. Follath, M. Chergui, C. Milne, H. T. Lemke, C. David, and P. Beaud
Opt. Lett. **44**, 574-577 (2019).
- [106] **Femtosecond phase-transition in hard x-ray excited bismuth**
M. Makita, I. Vartiainen, I. Mohacsi, C. Coleman, A. Diaz, H. O. Jönsson, P. Juranić, N. Medvedev, A. Meents, A. Mozzanica, N. Opara, C. Padeste, V. Panneels, V. Saxena, M. Sikorski, S. Song, L. Vera, P. R. Willmott, P. Beaud, C. J. Milne, B. Ziaja-Motyka, and C. David
Sci. Rep. **9**, 602 (2019).
- [105] **Dynamics of the photoinduced insulator-to-metal transition in a nickelate film**
V. Esposito, L. Rettig, E. M. Bothschafter, Y. Deng, C. Dornes, L. Huber, T. Huber, G. Ingold, Y. Inubushi, T. Katayama, T. Kawaguchi, H. Lemke, K. Ogawa, S. Owada, M. Radovic, M. Ramakrishnan, Z. Ristic, V. Scagnoli, Y. Tanaka, T. Togashi, K. Tono, I. Usov, Y. W. Windsor, M. Yabashi, S. L. Johnson, P. Beaud, U. Staub
Struct. Dyn. **5**, 064501 (2018).

- [104] **Ultrafast relaxation dynamics of the antiferrodistortive phase in Ca doped SrTiO₃**
M. Porer, M. Fechner, E. Bothschafter, L. Rettig, M. Savoini, V. Esposito, J. Rittmann, M. Kubli, M. J. Neugebauer, E. Abreu, T. Kubacka, T. Huber, G. Lantz, S. Parchenko, S. Grübel, A. Paarmann, J. Noack, P. Beaud, G. Ingold, U. Aschauer, S. L. Johnson, and U. Staub
Phys. Rev. Lett. **121**, 055701 (2018).
- [103] **The photoinduced transition in magnetoresistive manganites: a comprehensive view**
V. Esposito, L. Rettig, E. Abreu, E. Bothschafter, G. Ingold, M. Kawasaki, M. Kubli, G. Lantz, M. Nakamura, J. Rittman, M. Savoini, Y. Tokura, U. Staub, S. L. Johnson and P. Beaud,
Phys. Rev. B **97**, 014312 (2018).
- [102] **THz generation and detection by fluorenone based organic crystals**
M. Savoini, L. Huber, H. Cuppen, E. Abreu, M. Kubli, M. J. Neugebauer, Y. Duan, P. Beaud, J. Xu, T. Rasing, and S. L. Johnson
ACS Photonics **5**, 671-677 (2018).
- [101] **Domain size effects on the dynamics of a charge density wave in 1T-TaS₂**
G. Lantz, C. Laulhe, S. Ravy, M. Kubli, M. Savoini, K. Tasca, E. Abreu, V. Esposito, M. Porer, A. Ciavardini, J. Rittmann, P. Beaud, and S.L. Johnson
Phys. Rev. B **96**, 224101 (2017).
- [100] **Coupling between a charge density wave and magnetism in an Heusler material**
G. Lantz, M. J. Neugebauer, M. Kubli, M. Savoini, E. Abreu, K. Tasca, C. Dornes, V. Esposito, J. Rittmann, Y. W. Windsor, P. Beaud, G. Ingold, and S. L. Johnson
Phys. Rev. Lett. **119**, 227207 (2017).
- [99] **Perspective: THz-driven nuclear dynamics from solids to molecules**
P. Hamm, M. Meuwly, S. Johnson, P. Beaud, and U. Staub
Struct. Dyn. **4**, 061601 (2017).
- [98] **Perspective: Opportunities for ultrafast science at SwissFEL**
R. Abela, P. Beaud, J. A. van Bokhoven, M. Chergui, T. Feurer, J. Haase, G. Ingold, S. L. Johnson, G. Knopp, H. Lemke, C. J. Milne, B. Pedrini, P. Radi, G. Schertler, J. Standfuss, U. Staub, and L. Patthey
Struct. Dyn. **4**, 061602 (2017).
- [97] **Watching ultrafast responses of structure and magnetism in condensed matter with momentum-resolved probes**
S. L. Johnson, M. Savoini, P. Beaud, G. Ingold, U. Staub, F. Carbone, L. Castiglioni, M. Hengsberger, and J. Osterwalder
Struct. Dyn. **4**, 061506 (2017).
- [96] **Nonlinear electron-phonon coupling in doped manganites**
V. Esposito, R. Mankowsky, M. Fechner, H. Lemke, M. Chollet, J. M. Glowia, M. Nakamura, M. Kawasaki, Y. Tokura, U. Staub, P. Beaud, and M. Först
Phys. Rev. Lett. **118**, 247601 (2017).
- [95] **Ultrafast formation of a charge density wave state in 1T-TaS₂: observation at nanometer scales using time-resolved X-ray diffraction**
C. Laulhé, T. Huber, G. Lantz, A. Ferrer, S. O. Mariager, S. Grübel, J. Rittmann, J. A. Johnson, V. Esposito, A. Lübcke, L. Huber, M. Kubli, M. Savoini, V. L. R. Jacques, L. Cario, B. Corraze, E. Janod, G. Ingold, P. Beaud, S. L. Johnson, and S. Ravy
Phys. Rev. Lett. **118**, 247401 (2017).

- [94] **SwissFEL: The swiss X-ray free electron laser**
C.J. Milne, T. Schietinger, et al. (112 authors)
Appl. Sci. **7**, 720 (2017).
- [93] **Opportunities for chemistry at the SwissFEL X-ray free electron laser**
C. J. Milne, P. Beaud, M. Calvi, Y. Deng, C. Erny, R. Follath, U. Flechsig, C. P. Hauri, G. Ingold, P. Juranic, G. Knopp, H. Lemke, B. Pedrini, P. Radi, and L. Patthey
Chimia **71**, 299-307(9) (2017).
- [92] **Time-resolved X-ray powder diffraction study of photoinduced phase transition in Ti₃O₅ nanoparticles**
K. R. Tasca, V. Esposito, G. Lantz, P. Beaud, M. Kubli, M. Savoini, C. Giles, S. L. Johnson
Chem. Phys. Chem. **18**, 1385-1392 (2017).
- [91] **Ultrafast structural dynamics of the orthorhombic distortion in the Fe-pnictide parent compound BaFe₂As₂**
L. Rettig, S. O. Mariager, A. Ferrer, S. Grübel, J. A. Johnson, J. Rittmann, T. Wolf, S. L. Johnson, G. Ingold, P. Beaud, and U. Staub
Struct. Dyn. **3**, 023611 (2016).
- [90] **Ultrafast x-ray diffraction of a ferroelectric soft mode driven by broadband terahertz pulses**
S. Grübel, J. A. Johnson, P. Beaud, A. Ferrer, V. Haborets, L. Huber, T. Huber, G. Ingold, A. Kohutych, T. Kubacka, S.O. Mariager, J. Rittmann, Y. Vysochanskii, and S. L. Johnson
arXiv:1602.05435 (2016).
- [89] **THz near-field enhancement by means of isolated dipolar antennas: the effect of finite sample size**
M. Savoini, S. Grübel, S. Bagiante, H. Sigg, T. Feurer, P. Beaud, and S. L. Johnson
Opt. Expr. **24**, 4552-4562 (2016).
- [88] **Magnetic order dynamics in optically excited multiferroic TbMnO₃**
J. A. Johnson, T. Kubacka, M. C. Hoffmann, C. Vicario, S. de Jong, P. Beaud, S. Grübel, S.-W. Huang, L. Huber, Y. W. Windsor, E. M. Bothschafter, L. Patthey, Y.-D. Chuang, J. J. Turner, G. L. Dakovski, W.-S. Lee, M. P. Minitti, W. Schlotter, R. G. Moore, C. P. Hauri, S. M. Koohpayeh, V. Scagnoli, G. Ingold, S. L. Johnson, and U. Staub
Phys. Rev. B **92**, 184429 (2015).
- [87] **Femtosecond X-ray absorption study of electron localization in photoexcited anatase TiO₂**
F. G. Santomauro, A. Lübcke, J. Rittmann, E. Baldini, A. Ferrer, M. Silatani, P. Zimmermann, S. Grübel, J. A. Johnson, S. O. Mariager, P. Beaud, D. Grolimund, C. Borca, G. Ingold, S. L. Johnson, and M. Chergui
Sci. Rep. **5**, 14834 (2015).
- [86] **Coherent acoustic perturbation of second-harmonic-generation in NiO**
L. Huber, A. Ferrer, T. Kubacka, T. Huber, C. Dornes, T. Sato, K. Ogawa, K. Tono, T. Katayama, Y. Inubushi, M. Yabashi, Y. Tanaka, P. Beaud, M. Fiebig, V. Scagnoli, U. Staub, and S. L. Johnson
Phys. Rev. B **92**, 094304 (2015).

- [85] **Nonlinear delayed symmetry breaking in a solid excited by hard x-ray FEL pulses**
A. Ferrer, J. A. Johnson, T. Huber, S. O. Mariager, M. Trant, S. Grübel, D. Zhu, M. Chollet, J. Robinson, H. T. Lemke, G. Ingold, C. Milne, U. Staub, P. Beaud, and S. L. Johnson
Appl. Phys. Lett. **106**, 154101 (2015).
- [84] **Ultrafast structural dynamics of the Fe-pnictide parent compound BaFe₂As₂**
L. Rettig, S. O. Mariager, A. Ferrer, S. Grübel, J. A. Johnson, J. Rittmann, T. Wolf, S. L. Johnson, G. Ingold, P. Beaud, and U. Staub
Phys. Rev. Lett. **114**, 067402 (2015).
- [83] **X-ray study of femtosecond structural dynamics in the 2D charge density wave compound 1T-TaS₂**
C. Laulhé, L. Cario, B. Corraze, E. Janod, T. Huber, G. Lantz, S. Boulfaat, A. Ferrer, S. O. Mariager, J. A. Johnson, S. Grübel, A. Lübcke, G. Ingold, P. Beaud, S.L. Johnson, and S. Ravy
Physica B **460**, 100-104 (2015).
- [82] **Ultrafast structural and magnetic dynamics in the magnetic shape memory alloy Ni₂MnGa**
S. O. Mariager, C. Dornes, J. A. Johnson, A. Ferrer, S. Grübel, T. Huber, A. Caviezel, S. L. Johnson, T. Eichhorn, G. Jakob, H. J. Elmers, P. Beaud, C. Quitmann, and G. Ingold
Phys. Rev. B **90**, 161103(R) (2014).
- [81] **A time-dependent order parameter for ultrafast photoinduced phase transitions**
P. Beaud, A. Caviezel, S. O. Mariager, L. Rettig, G. Ingold, C. Dornes, S.-W. Huang, J. A. Johnson, M. Radovic, T. Huber, T. Kubacka, A. Ferrer, H. T. Lemke, M. Chollet, D. Zhu, J. Glowia, M. Sikorski, A. Robert, H. Wadati, M. Nakamura, M. Kawasaki, Y. Tokura, S. L. Johnson, and U. Staub
Nature Mater. **13**, 923-927 (2014).
- [80] T. Huber, S. O. Mariager, A. Ferrer, H. Schäfer, J. A. Johnson, S. Grübel, A. Lübcke, A. Caviezel, L. Huber, T. Kubacka, C. Dornes, C. Laulhe, S. Ravy, G. Ingold, P. Beaud, J. Demsar, and S. L. Johnson
Coherent structural dynamics of a prototypical charge-density-wave-to-metal transition
Phys. Rev. Lett. **113**, 026401 (2014).
- [79] **Persistence of magnetic order in a highly excited Cu²⁺ state in CuO**
U. Staub, R. A. de Souza, P. Beaud, E. Möhr-Vorobeva, G. Ingold, A. Caviezel, V. Scagnoli, B. Delley, W. F. Schlotter, J. J. Turner, O. Krupin, W.-S. Lee, Y.-D. Chuang, L. Patthey, R. G. Moore, D. Lu, M. Yi, P. S. Kirchmann, M. Trigo, P. Denes, D. Doering, Z. Hussain, Z. X. Shen, D. Prabhakaran, A. T. Boothroyd, and S. L. Johnson
Phys. Rev. B **89**, 220401(R) (2014).
- [78] **Large amplitude spin dynamics driven by a THz pulse in resonance with an electromagnon**
T. Kubacka, J. A. Johnson, M. C. Hoffmann, C. Vicario, S. de Jong, P. Beaud, S. Grübel, S-W. Huang, L. Huber, L. Patthey, Y-D. Chuang, J. J. Turner, G. L. Dakovski, W-S. Lee, M. P. Minitti, W. Schlotter, R. G. Moore, C. Hauri, S. M. Koohpayeh, V. Scagnoli, G. Ingold, S. L. Johnson, and U. Staub
Science **343**, 1333 (2014).
- [77] **Science opportunities at the SwissFEL X-ray laser**
B. D. Patterson, P. Beaud, H-H. Braun, C. Dejoie, G. Ingold, Ch. Milne, L. Patthey, B. Pedrini, J. Slatzchenko, and R. Abela
Chimia **68**, 73-78 (2014).

- [76] **Temperature-dependent electron-phonon coupling in $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ probed by femtosecond X-ray diffraction**
B. Mansart, M. J. G. Cottet, G. F. Mancini, T. Jarlborg, S. B. Dugdale, S. L. Johnson, S. O. Mariager, C. J. Milne, P. Beaud, S. Grübel, J. A. Johnson, T. Kubacka, G. Ingold, K. Prsa, H. M. Ronnow, K. Conder, E. Pomjakushina, M. Chergui, and F. Carbone
Phys. Rev. B **88**, 054507 (2013).
- [75] **Identifying coherent lattice modulations coupled to charge and orbital order in a manganite**
A. Caviezel, S. O. Mariager, S. L. Johnson, E. Möhr-Vorobeva, S.-W. Huang, G. Ingold, U. Staub, C. J. Milne, S.-W. Cheong, and P. Beaud
Phys. Rev. B **87**, 205104 (2013).
- [74] **Direct observation of non-fully-symmetric coherent optical phonons by femtosecond x-ray diffraction**
S. L. Johnson, P. Beaud, E. Möhr-Vorobeva, A. Caviezel, G. Ingold, and C. J. Milne
Phys. Rev. B **87**, 054301 (2013).
- [73] **Efficient light coupling for optically excited high-density metallic nanotip arrays**
A. Mustonen, P. Beaud, E. Kirk, T. Feurer, and S. Tsujino
Sci. Rep. **2**, 915 (2012).
- [72] **Femtosecond dynamics of the structural transition in mixed valence manganites**
A. Caviezel, U. Staub, S. L. Johnson, S. O. Mariager, E. Möhr-Vorobeva, G. Ingold, C. J. Milne, M. Garganourakis, V. Scagnoli, S. W. Huang, Q. X. Jia, S.-W. Cheong, and P. Beaud
Phys. Rev. B **86**, 174105 (2012).
- [71] **Coherent phonon dynamics at the martensitic phase transition of Ni_2MnGa**
S. O. Mariager, A. Caviezel, P. Beaud, C. Quitmann, and G. Ingold
Appl. Phys. Lett. **100**, 261911 (2012).
- [70] **Structural and magnetic dynamics of a laser induced phase transition in FeRh**
S. O. Mariager, F. Pressacco, G. Ingold, E. Mancini, A. Caviezel, E. Möhr-Vorobeva, P. Beaud, S. L. Johnson, C. Milne, E. Fullerton, R. Feidenhans'l, C. H. Back, and C. Quitmann
Phys. Rev. Lett. **108**, 087201 (2012).
- [69] **Femtosecond dynamics of the collinear-to-spiral antiferromagnetic phase transition in CuO**
S. L. Johnson, R. A. De Souza, U. Staub, P. Beaud, E. Möhr-Vorobeva, G. Ingold, A. Caviezel, V. Scagnoli, W. F. Schlotter, J. J. Turner, O. Krupin, W.-S. Lee, Y.-D. Chuang, L. Patthey, R. G. Moore, D. Lu, M. Yi, P. S. Kirchmann, M. Trigo, P. Denes, D. Doering, Z. Hussain, Z.-X. Shen, and A. T. Boothroyd
Phys. Rev. Lett. **108**, 037203 (2012).
- [68] **Structural response to non-thermal melting of a charge density wave**
E. Möhr-Vorobeva, S. L. Johnson, P. Beaud, U. Staub, R. De Souza, C. Milne, G. Ingold, J. Demsar, H. Schäfer, and A. Titov
Phys. Rev. Lett. **107**, 036403 (2011).
- [67] **Probing the transition from hydrophilic to hydrophobic solvation with atomic scale**
V.-T. Pham, T. J. Penfold, R. M. van der Veen, F. Lima, A. El Nahhas, S. L. Johnson, P. Beaud, R. Abela, C. Bressler, I. Tavernelli, C. J. Milne, and M. Chergui
J. Am. Chem. Soc. **133**, 12740-12748 (2011).

- [66] **Five picocoulomb electron bunch generation by ultrafast laser-induced field emission from metallic nano-tip arrays**
A. Mustonen, P. Beaud, E. Kirk, T. Feurer, and S. Tsujino
Appl. Phys. Lett. **99**, 103504 (2011).
- [65] **Picosecond dynamics of laser-induced strains in graphite**
M. Harb, A. Jurgilaitis, H. Enquist, R. Nüske, C. v. Korff Schmising, J. Gaudin, S. L. Johnson, C. J. Milne, P. Beaud, E. Vorobeva, A. Caviezel, S. O. Mariager, G. Ingold, and J. Larsson
Phys. Rev. B **84**, 045435 (2011).
- [64] **Ultrafast structural dynamics in condensed matter**
P. Beaud, S. L. Johnson, E. Vorobeva, C. J. Milne, A. Caviezel, S. O. Mariager, R. A. De Souza, U. Staub, and G. Ingold
Chimia **65**, 308-312 (2011).
- [63] **Non-equilibrium phonon dynamics studied by grazing incidence femtosecond crystallography**
S. L. Johnson, P. Beaud, E. Vorobeva, C. J. Milne, E. D. Murray, S. Fahy, and G. Ingold
Acta Crystallogr. A **66**, 157-167 (2010).
- [62] **Femtosecond X-ray Absorption Spectroscopy of a Light-Driven Spin-Crossover Process**
C. Milne, V.-T. Pham, W. Gawelda, A. E. Nahhas, R. M. van der Veen, S. L. Johnson, P. Beaud, G. Ingold, C. Borca, D. Grolimund, R. Abela, M. Chergui, and C. Bressler
Acta Phys. Pol. A **117**, 392-394 (2010).
- [61] **Johnson et al. Reply**
S. L. Johnson, P. Beaud, E. Vorobeva, C. J. Milne, E. D. Murray, S. Fahy, and G. Ingold
Phys. Rev. Lett. **104**, 029602 (2010).
- [60] **Full reconstruction of a crystal unit cell structure during coherent femtosecond motion**
S. L. Johnson, E. Vorobeva, P. Beaud, C. Milne, and G. Ingold
Phys. Rev. Lett. **103**, 205501 (2009).
- [59] **An ultrafast structural phase transition driven by photo-induced melting of charge and orbital order**
P. Beaud, S. L. Johnson, E. Vorobeva, U. Staub, R. A. De Souza, C. J. Milne, Q. X. Jia, and G. Ingold
Phys. Rev. Lett. **103**, 155702 (2009).
- [58] **Time-resolved x-ray absorption spectroscopy: watching atoms dance**
C. J. Milne, V. T. Pham, W. Gawelda, R. M. van der Veen, A. El Nahhas, S. L. Johnson, P. Beaud, G. Ingold, F. Lima, D. A. Vithanage, M. Benfatto, D. Grolimund, C. Borca, M. Kaiser, A. Hauser, R. Abela, C. Bressler, and M. Chergui
IOP Conf. Proc. **190**, 012052 (2009).
- [57] **Local structural changes in excited $\text{Ti}^{3+}:\text{Al}_2\text{O}_3$ studied by time-resolved XANES**
E. Vorobeva, S. L. Johnson, P. Beaud, C. J. Milne, M. Benfatto, and G. Ingold
Phys. Rev. B **80**, 134301 (2009).
- [56] **Directly observing squeezed phonon states with femtosecond x-ray diffraction**
S. L. Johnson, P. Beaud, E. Vorobeva, C. J. Milne, E. D. Murray, S. Fahy, and G. Ingold
Phys. Rev. Lett. **102**, 175503 (2009).

- [55] **Femtosecond XANES study of the light-induced spin crossover dynamics in an iron (II) complex**
C. Bressler, C. Milne, V. T. Pham, A. ElNahas, R.M. van der Veen, W. Gawelda, S. L. Johnson, P. Beaud, D. Grolimund, C. Borca, G. Ingold, R. Abela, and M. Chergui
Science **323**, 489-492 (2009).
- [54] **Influence of lattice heating time on femtosecond laser-induced strain waves in InSb**
F. S. Krasniqi, S. L. Johnson, P. Beaud, M. Kaiser, D. Grolimund, and G. Ingold
Phys. Rev. B **78**, 174302 (2008).
- [53] **Towards pump-probe resonant x-ray diffraction at femtosecond undulator sources**
G. Ingold, R. Abela, P. Beaud, S. L. Johnson, and U. Staub
Z. Kristallogr. **223**, 292-306 (2008).
- [52] **Nanoscale depth-resolved coherent femtosecond motion in laser excited bismuth**
S. L. Johnson, P. Beaud, C. J. Milne, F. S. Krasniqi, E. S. Zijlstra, M. E. Garcia, M. Kaiser, R. Abela, and G. Ingold
Phys. Rev. Lett. **100**, 155501 (2008).
- [51] **Ultrafast electron emission from metallic nano-tip arrays induced by near infrared femtosecond laser pulses**
S. Tsujino, P. Beaud, E. Kirk, T. Vogel, H. Sehr, J. Gobrecht, and A. Wrulich
Appl. Phys. Lett. **92**, 193501 (2008).
- [50] **Spatiotemporal stability of femtosecond hard x-ray undulator radiation studied by control of coherent optical phonons**
P. Beaud, S. L. Johnson, A. Streun, R. Abela, D. Abramsohn, D. Grolimund, F. Krasniqi, T. Schmidt, V. Schlott, and G. Ingold
Phys. Rev. Lett. **99**, 174801 (2007).
- [49] **Time resolved investigation of the ν_1 ro-vibrational Raman band of H_2CO with fs CARS**
A. Walser, P. Beaud, P. Radi, M. Tulej, T. Gerber, and G. Knopp
J. Raman Spectrosc. **38**, 147-153 (2007).
- [48] **Comparative study of degenerate four-wave mixing and cavity ringdown signal intensities of formaldehyde in a molecular beam**
M. Tulej, M. Meisinger, G. Knopp, A. Walser, P. Beaud, T. Gerber, and P. P. Radi
J. Raman Spectrosc. **37**, 680-688 (2006).
- [47] **Neutral molecular ZnX , $\text{X}=\text{O,OH,N}$ compounds in a molecular beam**
D. Cannavo, G. Knopp, P. Radi, P. Beaud, M. Tulej, T. Gerber, P. Bodek and A. Wokaun
J. Mol. Struct. **782**, 67-72 (2006).
- [46] **Degenerate and two-color resonant four-wave mixing applied to the rotational characterization of high-lying vibrational states of formaldehyde ($\tilde{\text{A}}$, $^1\text{A}_2$)**
M. Tulej, M. Meisinger, G. Knopp, A. Walser, P. Beaud, T. Gerber, and P. P. Radi
J. Raman Spectrosc. **37**, 376-383 (2006).
- [45] **Photo-fragment excitation (PHOFEX) by DFWM and LIF: propensities for $\text{H}_2\text{CO} \rightarrow \text{H}_2\text{CO} + \text{H}$ near the S_0 threshold**
M. Tulej, G. Knopp, P. Beaud, T. Gerber, and P. P. Radi
J. Raman Spectrosc. **36**, 109-115 (2005).

- [44] **Collision-induced line broadening and mixing probed by femtosecond CARS**
G. Knopp, P. Beaud, P. Radi, M. Tulej, and T. Gerber
Asian Chem. Lett. **7**, 237 (2004).
- [43] **Femtosecond time-resolved molecular spectroscopy**
B. Lavorel, H. Tran, E. Hertz, O. Faucher, P. Joubert, M. Motzkus, T. Buckup, T. Lang, H. Skenderović, G. Knopp, P. Beaud, and H.-M. Frey
C. R. Phys. **5**, 215-229 (2004).
- [42] **Determination of the ortho/para Deuterium concentration ratio with femtosecond CARS**
G. Knopp, K. Kirch, P. Beaud, K. Mishima, H. Spitzer, P. Radi, M. Tulej, and T. Gerber
J. Raman Spectrosc. **34**, 989-993 (2003).
- [41] **Two-color resonant four-wave mixing: rotational characterization of vibrationally excited HCO (X^2A')**
P. P. Radi, M. Tulej, G. Knopp, P. Beaud, and T. Gerber
J. Raman Spectrosc. **34**, 1037-1044 (2003).
- [40] **Rotationally inelastic collisions between N₂ and rare gases: an extension of the angular momentum scaling law**
P. Beaud, T. Gerber, P. Radi, M. Tulej, and G. Knopp
Chem. Phys. Lett. **373**, 251-257 (2003).
- [39] **The orthopara equilibrium in a liquid D₂ neutron moderator under irradiation**
F. Atchison, P. Beaud, T. Brys, M. Daum, P. Fierlinger, R. Henneck, T. Hofmann, K. Kirch, G. Kühne, G. Knopp, A. Pichlmaier, A. Serebrov, H. Spitzer, J. Wambach, J. Wimmer, A. Wokaun, K. Bodek, P. Geltendorf, M. Giersch, J. Zmeskal, and K. Mishima
Phys. Rev. B **68**, 094114 (2003).
- [38] **Collision induced rotational energy transfer probed by time-resolved CARS**
G. Knopp, P. Radi, M. Tulej, T. Gerber, and P. Beaud
J. Chem. Phys. **118**, 8223-8233 (2003).
- [37] **Scaling rotationally inelastic collisions with an effective angular momentum parameter**
P. Beaud and G. Knopp
Chem. Phys. Lett. **371**, 194-201 (2003).
- [36] **Pressure dependent N₂ Q-branch fs-CARS measurements**
G. Knopp, P. Beaud, P. Radi, M. Tulej, B. Bougie, D. Cannavo, and T. Gerber
J. Raman Spectrosc. **33**, 861-865 (2002).
- [35] **High resolution femtosecond CARS: determination of rotational constants, molecular anharmonicity, collisional lineshifts, temperature**
T. Lang, M. Motzkus, H.-M. Frey, and P. Beaud
J. Chem. Phys. **115**, 5418-5426 (2001).
- [34] **Flame thermometry by femtosecond CARS**
P. Beaud, H.-M. Frey, T. Lang, and M. Motzkus
Chem. Phys. Lett. **344**, 407-412 (2001).

- [33] **OH concentration measurements by resonant holographic interferometry and comparison with direct numerical simulations**
A.-P. Tzannis, J. C. Lee, P. Beaud, H.-M. Frey, T. Gerber, B. Mischler, P. Radi, and K. Boulouchos
Flow, Turbul. Combust. **64**, 183-196 (2000).
- [32] **Determination of rotational constants in a molecule by femtosecond four-wave mixing**
H.-M. Frey, P. Beaud, T. Gerber, B. Mischler, P. P. Radi, and A.-P. Tzannis
J. Raman Spectrosc. **31**, 71-76 (2000).
- [31] **Femtosecond photoionization of (H₂O)_n and (D₂O)_n clusters**
P. P. Radi, P. Beaud, D. Franzke, H.-M. Frey, T. Gerber, B. Mischler, and A.-P. Tzannis
J. Chem. Phys. **111**, 512-518 (1999).
- [30] **Absolute concentration measurements using DFWM and modeling of OH and S₂ in a fuel-rich H₂/air/SO₂ flame**
P. P. Radi, B. Mischler, A. Schlegel, A.-P. Tzannis, P. Beaud, and T. Gerber
Combustion and Flame **118**, 301-307 (1999).
- [29] **Femtosecond nonresonant degenerate four wave mixing at atmospheric pressure and, in a free jet**
H.-M. Frey, P. Beaud, T. Gerber, B. Mischler, P. P. Radi, and A.-P. Tzannis
Appl. Phys. B **68**, 735-739 (1999).
- [28] **Picosecond investigation of the collisional deactivation of OH (A²Σ⁺, v'=1, N = 4,12), in an atmospheric pressure methane/air flame**
P. Beaud, P. P. Radi, D. Franzke, H.-M. Frey, B. Mischler, A.-P. Tzannis, and T. Gerber
Appl. Opt. **37**, 3354-3367 (1998).
- [27] **Analysis of radicals in combustion processes**
P. P. Radi, P. Beaud, H.-M. Frey, T. Gerber, B. Mischler, and A.-P. Tzannis
Chimia **51**, 771-776 (1997).
- [26] **Phase conjugate resonant holographic interferometry in a 2D diffusion flame**
A.-P. Tzannis, P. Beaud, H.-M. Frey, T. Gerber, B. Mischler, and P. P. Radi
Appl. Opt. **36**, 7978-7983 (1997).
- [25] **Stimulated emission pumping of OH and NH in flames by using two-color resonant four-wave mixing**
P. P. Radi, H.-M. Frey, B. Mischler, A.-P. Tzannis, P. Beaud, and T. Gerber
Chem. Phys. Lett. **265**, 271-276 (1997).
- [24] **Photochemistry at high temperatures potential of ZnO as a high temperature photocatalyst**
M. Schubnell, I. Kamber, and P. Beaud
Appl. Phys. A **64**, 109-113 (1997).
- [23] **Degenerate four-wave-mixing of S₂ and OH in fuel-rich Propane/air/SO₂ flames**
B. Mischler, P. Beaud, T. Gerber, A.-P. Tzannis, and P. P. Radi
Combust. Sci. Technol. **119**, 375-393 (1996).
- [22] **Multi-terawatt femtosecond Cr:LiSAF laser**
P. Beaud, E. J. Miesak, and M. Richardson
IEEE J. Quant. Electron. **31**, 317-325 (1995).

- [21] **A 10 terawatt femtosecond laser plasma facility**
M. Richardson, S. Grantham, K. Gäbel, G. Shimkaveg, and P. Beaud
SPIE **2633**, 324-336 (1995).
- [20] **Optical amplification characteristics of Cr:LiSAF and Cr:LiCAF under flashlamp pumping**
P. Beaud, M. Richardson, Y.-F. Chen, and B. H. T. Chai
IEEE J. Quant. Electron. **30**, 1259-1266 (1994).
- [19] **8-TW, 90-fs, Cr:LiSAF laser**
P. Beaud, M. Richardson, E. Miesak, and B. Chai
Opt. Lett. **18**, 1550-1552 (1993).
- [18] **110 fs Fourier-transform limited Gaussian pulses from a Cr:LiSAF regenerative amplifier**
P. Beaud, E. Miesak, Y.-F. Chen, B. H. T. Chai, and M. C. Richardson
Opt. Commun. **95**, 46-50 (1993).
- [17] **Self-focusing and optical damage in Cr:LiSAF and Cr:LiCAF**
M. Richardson, M. J. Soileau, P. Beaud, Y.-F. Chen, R. DeSalvo, S. Garnov, D. J. Hagan,
S. Klimentov, M. SheikBahae, A. A. Said, E. Van Stryland, and B. H. T. Chai
SPIE **1848**, 392-402 (1993).
- [16] **Gain properties of LiSrAlF₆Cr³⁺**
P. Beaud, Y.-F. Chen, B. H. T. Chai, and M. C. Richardson
Opt. Lett. **17**, 1064-1066 (1992).
- [15] **Coherent phozon seeding – a scheme for ultra stable ultrashort pulse generation**
H. P. Weber, W. Hodel, J. Q. Bi, P. Beaud, and D. S. Peter
IOP Conf. Series. **126**, 83-88 (1992).
- [14] **Bulk GaAlAs mirror as a saturable absorber for subpicosecond pulse generation around 835 nm**
J. Q. Bi, W. Hodel, P. Beaud, J. Schütz, H. P. Weber, M. Proctor, M. A. Dupertuis, D. Martin,
F. Morier-Genoud, and F. K. Reinhart
Opt. Commun. **89**, 245-248 (1992).
- [13] **Coherent photon seeding: a technique to generate clean subpicosecond pulses**
W. Hodel, H.P. Weber, P. Beaud, J. Q. Bi, and D. S. Peter
SPIE **1842**, 130-137 (1992).
- [12] **Passive stabilization of a synchronously pumped mode-locked laser with an integrated seeding unity**
D. S. Peter, P. Beaud, W. Hodel, and H. P. Weber
Opt. Lett. **16**, 405-407 (1991).
- [11] **Experimental and theoretical study of a new technique to stabilize synchronously pumped mode locked lasers**
J. Q. Bi, W. Hodel, P. Beaud, and H. P. Weber
IOP Conf. Ser. **115**, 109-112 (1991).
- [10] **Experimental observation of the self-stabilization of a synchronously pumped dye laser**
P. Beaud, J. Q. Bi, W. Hodel, and H. P. Weber
Opt. Commun. **80**, 31-36 (1990).

- [9] **Demonstration of a high speed 1.3 μm photodetector on a Si substrate**
M. Zirngibl, J. Bischoff, M. Illegems, J. Hirtz, B. Bartenlian, P. Beaud, and W. Hodel *Electron. Lett.* **26**, 1027-1029 (1990).
- [8] **Optical characterization of ASG waveguides using femtosecond OTDR techniques**
E. McGoldrick, P. Beaud, J. Schütz, W. Hodel, C. Deutsch, N. Thomas, and S. Hubbard *Opt. Lett.* **15**, 1354-1356 (1990).
- [7] **Submillimeter optical reflectometry**
H. H. Gilgen, R.P. Novák, R. P. Salathé, W. Hodel, and P. Beaud *J. Lightwave Technol.* **7**, 1225-1233 (1989).
- [6] **Optical reflectometry with micrometer resolution for the investigation of integrated optical devices**
P. Beaud, J. Schütz, W. Hodel, H. P. Weber, H. H. Gilgen, and R. P. Salathé *IEEE J. Quant. Electron.* **25**, 755-759 (1989).
- [5] **Ultrashort pulse propagation, pulse-break up and fundamental soliton formation in a single mode optical fiber**
P. Beaud, W. Hodel, B. Zysset, and H. P. Weber *IEEE J. Quant. Electron.* **23**, 1938-1946 (1987).
- [4] **Generation of optical solitons in the wavelength region 1.37 - 1.49 μm**
B. Zysset, P. Beaud, and W. Hodel *Appl. Phys. Lett.* **50**, 1027-1029 (1987).
- [3] **Stable 1.3 μm subpicosecond pulses from a dye laser excited by compressed Nd:YAG P.**
Beaud, B. Zysset, and H. P. Weber *SPIE* **701**, 446-450 (1987).
- [2] **200 femtosecond pulses at 1.06 μm generated with a double-stage pulse compressor**
B. Zysset, W. Hodel, P. Beaud, and H. P. Weber *Opt. Lett.* **11**, 156-158 (1986).
- [1] **1.3- μm subpicosecond pulses from a dye laser pumped by compressed Nd:YAG-laser pulses**
P. Beaud, B. Zysset, A. P. Schwarzenbach, and H. P. Weber *Opt. Lett.* **11**, 24-26 (1986).

Other journals, books chapters and proceedings (partially refereed)

- [41] **SwissFEL instrument ESB femtosecond pump-probe diffraction and scattering**
G. Ingold, J. Rittmann, P. Beaud, M. Divall, C. Erny, U. Flechsig, R. Follath, C. P. Hauri, S. Hunziker, P. Juranic, A. Mozzanica, B. Pedrini, L. Sala, L. Patthey, B. D. Patterson, and R. Abela *AIP Conf. Proc.* **1741**, 030039 (2016).

- [40] **Coherent dynamics of structural symmetry during the ultrafast melting of a charge density wave**
T. Huber, S. O. Mariager, A. Ferrer, H. Schaefer, J. A. Johnson, S. Grübel, A. Lübcke, A. Caviezel, L. Huber, T. Kubacka, C. Dornes, C. Laulhe, S. Ravy, G. Ingold, P. Beaud, J. Demsar and S. L. Johnson
in *Ultrafast Phenomena XIX*, Yamanouchi, K., Cundiff, S., de Vivie-Riedle, R., Kuwata-Gonokami, M., DiMauro, L. (Eds.), *Springer Proc. Phys.* **162**, 248-251 (2015).
- [39] **SLS: pushing the envelope based on stability**
M. Aiba, P. Beaud, M. Böge, G. Ingold, B. Keil, A. Lüdecke, N. Milas, L. Rivkin, Á. Saá Hernandez, T. Schilcher, V. Schlott, and A. Streun
Synchr. Rad. News **26**, 4 - 8 (2013).
- [38] **Optical and x-ray time resolved study of the structural transition in mixed valence manganites**
A. Caviezel, U. Staub, S. L. Johnson, S. O. Mariager, G. Ingold, E. Möhr-Vorobeva, M. Garganourakis, S.-W. Huang, C. J. Milne, Q. X. Jia, S.-W. Cheong, and P. Beaud
in *Ultrafast Phenomena XVIII*, M. Chergui, A. Taylor, S. Cundiff, R. de Vivie-Riedle and K. Yamagouchi, eds., *EPJ Web of Conferences* **41**, 03002 (2013).
- [37] **Femtosecond laser-induced CDW melting in TiSe₂**
E. Vorobeva, S. L. Johnson, P. Beaud, U. Staub, R. De Souza, C. Milne, J. Demsar, H. Schäfer, A. Titov and G. Ingold
in *Ultrafast Phenomena XVII*, M. Chergui, D. Jonas, E. Riedle, R. Schoenlein and A. Taylor, eds. (Oxford University Press, 2011) 164-166.
- [36] **Laser induced field emission from metallic field emitters: near field enhancement of optical electric field at metallic nano-surfaces**
A. Mustonen, P. Beaud, E. Kirk, T. Feurer, and S. Tsujino
Proc. 24th International Vacuum Manoelectronics Conference, Ed. A. Klumper (Wuppertal, Germany 2011) 97-98.
- [35] **Pulsed field emission from molded metallic field emitter arrays with single gate electrode**
S. Tsujino, M. L. Paraliiev, C. Gough, A. Mustonen, P. Beaud, E. Kirk, T. Vogel
Proc. 23rd International Vacuum Nanoelectronics Conference (Palo Alto, USA, 2010) 96-97.
- [34] **Ultrafast laser-induced electron emission from all-metal field emitter array**
A. Mustonen, P. Beaud, E. Kirk, T. Vogel, T. Feurer, B. Oswald, and S. Tsujino
Proc. 8th International Vacuum Electron Sources Conference and Nanocarbon (Nanjing, China 2010) 125-126.
- [33] **Influence of laser heating time on strain wave dynamics in InSb**
F. Krasniqi, S. L. Johnson, P. Beaud, M. Kaiser, D. Grolimund, and G. Ingold
in *Ultrafast Phenomena XVI*, P. Corkum, S. Silvestri, K. A. Nelson, E. Riedle, R. W. Schoenlein, eds., *Springer Series in Chemical Physics* **92**, 238-240 (2009).
- [32] **Femtosecond x-ray absorption spectroscopy of a photoinduced spin-crossover process**
C. Milne, V.-T. Pham, W. Gawelda, A. El Nahhas, R. M. van der Veen, S. L. Johnson, P. Beaud, G. Ingold, C. Borca, D. Grolimund, R. Abela, M. Chergui, and C. Bressler
in *Ultrafast Phenomena XVI*, P. Corkum, S. Silvestri, K. A. Nelson, E. Riedle, R. W. Schoenlein, eds., *Springer Series in Chemical Physics* **92**, 122-124 (2009).

- [31] **Atomic motion in laser excited bismuth studied with femtosecond x-ray diffraction**
P. Beaud, S. L. Johnson, C.J. Milne, F. Krasniqi, E. Vorobeva, and G. Ingold
in *Ultrafast Phenomena XVI*, P. Corkum, S. Silvestri, K. A. Nelson, E. Riedle, R. W. Schoenlein, eds., *Springer Series in Chemical Physics* **92**, 104-106 (2009).
- [30] **Laser-beam interaction and calculation of the sliced bunch radiation spectra for the SLS FEMTO beam line**
D. K. Kalantaryan, G. A. Amatuni, V. M. Tsakanov, P. Beaud, G. Ingold, and A. Streun
Proc. EPAC 2008 (Genoa, Italy, June 23-27, 2008), 2040-2042.
- [29] **FEMTO: A sub-ps tunable hard x-ray undulator source for laser/x-ray pump-probe experiments at SLS**
G. Ingold, P. Beaud, S. L. Johnson, D. Grolimund, V. Schlott, T. Schmidt, and A. Streun
Synchr. Rad. News 20 (5), 39-43 (2007).
- [28] **Sub-picosecond tunable hard x-ray undulator source for laser/x-ray pump-probe experiments**
G. Ingold, P. Beaud, S. Johnson, A. Streun, R. Abela, A. AlAdwan, D. Abramssohn, M. Boege, D. Grolimund, A. Keller, L. Rivkin, T. Schilcher, T. Schmidt, V. Schlott, L. Schulz, F. Van der Veen, and D. Zimoch
AIP Conf. Proc. 879 (AIP, New York, 2007) 1198-2002.
- [27] **Investigation of Coriolis Perturbations on the ro-vibrational n1 Band of H₂CO with fs-CARS**
G. Knopp, A. M. Walser, P. P. Radi, P. Beaud, M. Tulej, T. Gerber
in *Ultrafast Phenomena XV*, P. Corkum, D. M. Jonas, R. J. D. Miller, A. M. Weiner, *Springer Series in Chemical Physics* **88**, 567-569, (2007) .
- [26] **THz diagnostic for the femtosecond bunch slicing project at the Swiss Light Source**
V. Schlott, D. Abrahamson, G. Ingold, P. Lerch, and P. Beaud
Proc. EPAC 2006, Edingburgh, United Kingdom, 1229-1231 (2006).
- [25] **Sub-picosecond x-ray source FEMTO at SLS**
A. Streun, R. Abela, P. Beaud, M. Böge, D. Grolimund, G. Ingold, S. Johnson, A. Keller, L. Rivkin, V. Schlott, T. Schmidt, and L. Schulz
Proc. EPAC 2006, Edingburgh, United Kingdom, 3427-3429 (2006).
- [24] **Collision-induced line broadening and mixing probed by femtosecond CARS**
P. Beaud, G. Knopp, P. Radi, M. Tulej, and T. Gerber
in *Time Resolved Vibrational Spectroscopy*, S. Califano, P. Foggi and R. Righini, Eds. (Leo S. Olschki, Florence, 2005) 17-23.
- [23] **Collision induced rotational energy transfer. A new scaling law probed by fs CARS**
G. Knopp, P. Beaud, P. Radi, M. Tulej, and T. Gerber
in *Femtochemistry and Femtobiology: Ultrafast Events in Molecular Science*, M. Martin and J. T. Hynes, eds. (Elsevier, 2004) 69-72.
- [22] **Femtosecond photodissociation of the ethyl radical C₂H₅**
G. Knopp, P. Beaud, P. Radi, M. Tulej, and T. Gerber
in *Femtochemistry and Femtobiology: Ultrafast Dynamics in Molecular Science*, A. Douhal and J. Santamaria, eds. (World Scientific, Singapore, 2002) 117-121.

- [21] **High resolution femtosecond CARS spectroscopy**
H.-M. Frey, P. Beaud, T. Lang, and M. Motzkus,
in *Femtochemistry and Femtobiology: Ultrafast Dynamics in Molecular Science*, A. Douhal
and J. Santamaria, eds. (World Scientific, Singapore, 2002) 100-105.
- [20] **Femtosecond pulses of synchrotron radiation at the SLS storage ring**
G. Ingold, R. Abela, P. Beaud, L. Rivkin, V. Schlott, T. Schmidt, H.-C. Sigg, A. Streun, F. Van der
Veen, A. Wrulich, and B. Singh
Proc. PAC 2001 (Chicago IL, USA, 2001) 2656-2659.
- [19] **High resolution spectroscopy by fs-CARS in a molecular beam: vibrational anharmonicity,
rotational constants and isotope shift in a polyatomic molecule**
T. Lang, H.-M. Frey, P. Beaud, and M. Motzkus
in *Raman Spectroscopy* (John Wiley, New York, 2000) 362-363.
- [18] **Rotational recurrences by single resonant femtosecond degenerate four-wave mixing**
H. M. Frey, P. Beaud, T. Gerber, B. Mischler, P. P. Radi, and A.-P. Tzannis
Lasers'98 (STS press, McLean VA, USA, 1999) 116-122.
- [17] **A multi-terawatt femtosecond Cr:LiSAF Laser**
P. Beaud, M. C. Richardson, E. Miesak, and B. H. T Chai
in *Advanced Solid State Lasers 20*, T. Fan and B. Chai, eds. (Optical Soc. of America, 1994)
242-244.
- [16] **Large aperture 95 fs Terawatt Cr:LiSAF laser**
P. Beaud, M. C. Richardson, E. Miesak, and B. H. T. Chai,
in *Short Wavelength V: Physics with Intense Laser Pulses*, P. Corkum and M. Perry, eds.
(Optical Society of America, Washington D.C., 1993) 11-15.
- [15] **LiSAF: the next wave in tenability**
M. Richardson, V. Castillo, P. Beaud, M. Bass, B. Chai, G. Quarles, and W. Ignatuk
Photonics Spectra (October issue) 86-92 (1993).
- [14] **A flashlamp pumped Cr:LiSAF regenerative amplifier**
P. Beaud, E. Miesak, Y. F. Chen, B. Chai, and M. Richardson
in *Advanced Solid State Lasers 13*, L. Chase and A. Pinto, eds (Optical Society of America,
Washington D.C., 1992) 109-112.
- [13] **Small signal gain measurements in Cr-doped LiSAF and LiCAF**
Y.-F. Chen, P. Beaud, B. Chai, and M. Richardson
in *Advanced Solid State Lasers 13*, Eds L. Chase and A. Pinto (Optical Society of America,
Washington D.C., 1992) 10-13.
- [12] **Development of a high intensity femtosecond LiSAF laser**
M. C. Richardson, P. Beaud, B. Chai, E. Miesak, Y.-F. Chen, and V. Yanovsky
in *Ultrafast Phenomena VIII*, Eds J. L. Martin, A. Migus, G. A. Mourou, and A. H. Zewail,
Springer Series in Chemical Physics 55, 253-254 (1992).
- [11] **Méthodes de mesures optiques par retrodiffusion**
P. Novak, P. Beaud, W. Hodel, and H. H. Gilgen
Technische Mitteilungen PTT 70, 130-149 (1992).

- [10] **Optische Rückstreu-Messmethoden mit Mikrometer-Auflösung**
R. P. Novak, P. Beaud, W. Hodel, and H. H. Gilgen
Technische Mitteilungen PTT **69**, 421-432 (1992).
- [9] **Comparison between OTDR and OLCR with micrometer spatial resolution. New improved OLCR detection scheme and latest results on IOC**
R. P. Novak, H. H. Gilgen, P. Beaud, and W. Hodel
NBS Spec. Publ. **792** (US Dept. of Commerce, 1990) 35-38.
- [8] **Clean subpicosecond pulses by coupling resonantly to a linear high loss cavity**
P. Beaud, J. Q. Bi, J. Schütz, W. Hodel and H. P. Weber
in *Ultrafast Phenomena VII*, Eds C. B. Harris, E. P. Ippen, G. A. Mourou and A. H. Zewail,
Springer Series in Chemical Physics **53**, 23-26 (1990).
- [7] **High resolution optical reflectometry for the characterization of integrated optical devices**
P. Beaud, J. Schütz, W. Hodel, and H. P. Weber
in *Ultrafast Phenomena in Spectroscopy*, Eds E. Klose and B. Wilhelmi, *Springer Proc. in Physics* **49**, 111-116 (1990).
- [6] **Linear and nonlinear optical properties of glass fibers**
W. Hodel, B. Zysset, P. Beaud, and H. P. Weber
in *High Performance Optics*, Ed. B. Wilhelmi (Friedrich Schiller Universität, Jena, GDR, 1988)
160-184.
- [5] **Investigations of optical components in micrometer range using an OTDR system with the balanced heterodyne detection**
R. P. Novak, H. H. Gilgen, R. P. Salathé, W. Hodel, P. Beaud, J. Schütz, and H. P. Weber *NBS Spec. Publ.* **748** (US Dept. of Commerce, 1988) 7-9.
- [4] **High resolution optical time domain reflectometry for the investigation of integrated, optical device**
P. Beaud, J. Schütz, W. Hodel, H. P. Weber, H. H. Gilgen, and R. P. Salathé
IEE Conf. Publ. **292** (London UK, 1988) 553-556.
- [3] **80 fsec soliton pulses from an optical-nonlinear fiber resonator**
B. Zysset, P. Beaud, W. Hodel, and H. P. Weber
in *Ultrafast Phenomena V*, Eds G. R. Fleming and A. E. Siegman, Springer Series in Chemical Physics **46**, 54-57 (1986).
- [2] **80 fsec solitons generated in an optical fiber by parametric interaction near Raman resonance**
B. Zysset, P. Beaud, W. Hodel, and H. P. Weber
Proc. ECOOSA'86 (Firenze, Italy, 1986), 222-224.
- [1] **Radar reflectivity gradients in hail echoes**
W. Schmid, A. Waldvogel, and P. Beaud
Proc. 22nd Conference on Radar Meteorology (Am. Meteor. Soc., 1984) 123-128.

Patents

H.P. Weber, P. Beaud, J.Q. Bi, J. Schütz, W. Hodel

Process for reducing high-frequency noise components in the output radiation of a laser, process for generating short pulses, laser utilized for this purpose

US patent No. 07 / 689,487.

H.P. Weber, P. Beaud, J.Q. Bi, J. Schütz, W. Hodel

Verfahren zur Erzeugung kurzer Pulse und Laser hierzu

Europäisches Patent Nr. 91 105 467.4.

H.P. Weber, P. Beaud, J.Q. Bi, J. Schütz, W. Hodel

Verfahren zur Erzeugung kurzer Pulse und Laser zu dessen Durchführung,

Schweizerisches Patent Nr. 1 1610 / 906.