Morten Bache - DTU Orbit (18/11/2018)

Bache, Morten
moba@fotonik.dtu.dk

Department of Photonics Engineering - Associate Professor
Plasmonics and Metamaterials
Ultrafast Infrared and Terahertz Science

Research outputs:

**Multi-stage generation of extreme ultraviolet dispersive waves by tapering gas-filled hollow-core anti-resonant fibers**
Research output: Research - peer-review › Journal article – Annual report year: 2018

**Cascaded nonlinearities for ultrafast nonlinear optical science and applications**
Bache, M. 2017 DTU - Department of Photonics Engineering. 130 p.
Research output: Research › Doctoral thesis – Annual report year: 2018

**Curvature and position of nested tubes in hollow-core anti-resonant fibers**
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2017

**Experimental verification of the intrinsic ultrafast delayed nonlinearity of gold**
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2017

**Generation of multiple VUV dispersive waves using a tapered gas-filled hollow-core anti-resonant fiber**
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2017

**Influence of dispersion of nonlinearity on coherent supercontinuum generation bandwidth in photonic crystal fibers pumped at 2 μm**
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2017

**Multiple soliton compression stages in mid-IR gas-filled hollow-core fibers**
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2017

**Octave-spanning supercontinuum generation in a silicon-rich nitride waveguide: Erratum**
Research output: Research - peer-review › Comment/debate – Annual report year: 2017

**Parametrically tunable soliton-induced resonant radiation by three-wave mixing**
Research output: Research - peer-review › Journal article – Annual report year: 2017
Multiple-octave spanning high-energy mid-IR supercontinuum generation in bulk quadratic nonlinear crystals
Zhou, B. & Bache, M. 2016 In : APL Photonics. 1, 5, 12 p., 050802
Research output: Research - peer-review › Journal article – Annual report year: 2016

Multiple-μJ mid-IR supercontinuum generation in quadratic nonlinear crystals
Research output: Research - peer-review › Article in proceedings – Annual report year: 2016

Nonlinear Dynamics of Ultrashort Long-Range Surface Plasmon Polariton Pulses in Gold Strip Waveguides
Lysenko, O., Bache, M., Olivier, N., Zayats, A. V. & Lavrinenko, A. 2016 In : ACS Photonics. 3, 12, p. 2324-2329
Research output: Research - peer-review › Journal article – Annual report year: 2016

Nonlinear effects in propagation of long-range surface plasmon polaritons in gold strip waveguides
Research output: Research - peer-review › Article in proceedings – Annual report year: 2016

Nonlinear optical model for strip plasmonic waveguides
Lysenko, O., Bache, M. & Lavrinenko, A. 2016 In : Journal of the Optical Society of America B-optical Physics. 33, 7, p. 1341-1348
Research output: Research - peer-review › Journal article – Annual report year: 2016

Nonlinear optical properties of ultrathin metal layers

Octave-spanning supercontinuum generation in a silicon-rich nitride waveguide
Research output: Research - peer-review › Journal article – Annual report year: 2016

Octave-spanning supercontinuum generation in a silicon-rich nitride waveguide
Research output: Research - peer-review › Article in proceedings – Annual report year: 2016

Third-order susceptibility of gold for ultrathin layers
Research output: Research - peer-review › Journal article – Annual report year: 2016

Widely tunable mid-IR femtosecond resonant radiation induced by self-defocusing solitons in a quadratic nonlinear medium
Research output: Research - peer-review › Article in proceedings – Annual report year: 2016

High-energy pulse compressor using self-defocusing spectral broadening in anomalously dispersive media
Research output: Research › Patent – Annual report year: 2016

Coherent near-mid-IR supercontinuum generation in highly nonlinear multi-cladding liquid-core fiber designed for flat normal dispersion
Collision between soliton and dispersive wave in phase-mismatched quadratic nonlinear crystals

Dispersive waves induced by self-defocusing temporal solitons in a beta-barium-borate crystal.

Efficient supercontinuum generation in quadratic nonlinear waveguides without quasi-phase-matching

Energetic mid-IR femtosecond pulse generation by self-defocusing soliton-induced dispersive waves in a bulk quadratic nonlinear crystal
Zhou, B., Guo, H. & Bache, M. 2015 In : Optics Express. 23, 5, p. 6924-6936

Experimental observation of dispersive wave generation by self-defocusing nonlinearity in BBO crystal

High-energy compression of mid-IR pulses in a bulk nonlinear crystal

Improved Low-loss Hollow Core Anti-Resonant Silica Mid-IR Fibers

Low Loss Double-clad Hollow Core Anti-Resonant Fibers in the Mid-IR

Low-loss hollow-core silica fibers with adjacent nested anti-resonant tubes
Habib, S., Bang, O. & Bache, M. 2015 In : Optics Express. 23, 13, p. 17394-17406

Mid-IR femtosecond frequency conversion by soliton-probe collision in phase-mismatched quadratic nonlinear crystals

Supercontinuum generation in quadratic nonlinear waveguides without quasi-phase matching

Tunable mid-infrared radiations in quadratic media through near-infrared soliton interactions with second-harmonic resonances
Cascaded Quadratic Soliton Compression in Waveguide Structures.
Research output: Research › Ph.D. thesis – Annual report year: 2014

Efficient femtosecond mid-infrared pulse generation by dispersivewave radiation in bulk lithium niobate crystal
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

Efficient Femtosecond Mid-Infrared Pulse Generation by Dispersive Wave Radiation in Bulk Lithium Niobate Crystal
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

Few-cycle solitons and supercontinuum generation with cascaded quadratic nonlinearities in unpoled lithium niobate ridge waveguides
Research output: Research - peer-review › Journal article – Annual report year: 2014

Generating Efficient Femtosecond Mid-infrared Pulse by Single Near-infrared Pump Wavelength In Bulk Nonlinear Crystal Without Phase-matching
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

High-energy pulse compressor using self-defocusing spectral broadening in anomalously dispersive media
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

Highly coherent mid-IR supercontinuum by self-defocusing solitons in lithium niobate waveguides with all-normal dispersion
Research output: Research - peer-review › Journal article – Annual report year: 2014

Low-energy Self-defocusing Soliton Compression at Optical Communication Wavelengths in Unpoled Lithium Niobate Ridge Waveguide
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

Nanoplasmonic solution for nonlinear optics
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2014

Observation of an octave-spanning supercontinuum in the mid-infrared using ultrafast cascaded nonlinearities
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

Octave-Spanning Mid-IR Supercontinuum Generation with Ultrafast Cascaded Nonlinearities
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014

Soliton-induced nonlocal resonances observed through high-intensity tunable spectrally compressed second-harmonic peaks
Nonlinear wave equation in frequency domain: accurate modeling of ultrafast interaction in anisotropic nonlinear media

Broadband Cherenkov Radiation by Using Group-velocity-matching in Index-guiding Photonic Crystal Fiber

Completely background free broadband coherent anti-Stokes Raman scattering spectroscopy

Cross-correlation frequency-resolved optical gating by molecular vibration for ultrashort pulse

Directional Selective Nonlinear Transmission of Femtosecond Pulses in Glass-Metal Nanocomposites

Near- and Mid-IR Few-cycle Self-defocusing Soliton Compression in PPLN Waveguide

Near- and MID-IR few-cycle self-defocusing soliton compression in PPLN Waveguide

Pressure tunable cascaded third order nonlinearity and temporal pulse switching
Soliton compression to few-cycle pulses with a high quality factor by engineering cascaded quadratic nonlinearities

Spectral Compression of Intense Femtosecond Pulses by Self-Phase Modulation in Silica Glass

Temporal switching induced by cascaded third order nonlinearity

Ultrafast and octave-spanning optical nonlinearities from strongly phase-mismatched cascaded interactions

Improved thermal and strain performance of annealed polymer optical fiber Bragg gratings

Optical Cherenkov radiation by cascaded nonlinear interaction: an efficient source of few-cycle energetic near- to mid-IR pulses

Generating energetic few-cycle pulses at 800 nm using soliton compression with type 0 cascaded quadratic interaction in lithium niobate
Generating ultra-short energetic pulses with cascaded soliton compression in lithium niobate crystals
Zhou, B., Bache, M., Chong, A. & Wise, F. W. 2010 Proceedings EOSAM.
Research output: Research - peer-review » Article in proceedings – Annual report year: 2010

Hvordan er universet sammensat?
Bache, M. 2010 In: Scenario.
Research output: Communication » Contribution to newspaper - Newspaper article – Annual report year: 2010

Optical Cherenkov radiation in ultrafast cascaded second-harmonic generation
Research output: Research - peer-review » Journal article – Annual report year: 2010

Scaling laws for soliton pulse compression by cascaded quadratic nonlinearities (vol 24, pg 2752, 2007)
Research output: Research - peer-review » Journal article – Annual report year: 2010

Type-I cascaded quadratic soliton compression in lithium niobate: Compressing femtosecond pulses from high-power fiber lasers
Research output: Research - peer-review » Journal article – Annual report year: 2010

Controlling the outcome: how extremely short laser pulses can help us in the future
Research output: Communication » Book chapter – Annual report year: 2009

Designing microstructured polymer optical fibers for cascaded quadratic soliton compression of femtosecond pulses
Bache, M. 2009 In : Journal of the Optical Society of America - B - Optical Physics. 26, 3, p. 460-470
Research output: Research - peer-review » Journal article – Annual report year: 2009

Dispersive waves in fs cascaded second-harmonic generation
Research output: Research - peer-review » Article in proceedings – Annual report year: 2009

Cascaded quadratic soliton compression of high-power femtosecond fiber lasers in Lithium Niobate crystals
Research output: Research - peer-review » Article in proceedings – Annual report year: 2008

Compression limits in cascaded quadratic soliton compression
Research output: Research - peer-review » Article in proceedings – Annual report year: 2008

Controllable nonlocal behaviour by cascaded second-harmonic generation of fs pulses
Research output: Research - peer-review » Article in proceedings – Annual report year: 2008

Limits to compression with cascaded quadratic soliton compressors
Bache, M., Bang, O., Krolikowski, W., Moses, J & Wise, F. W. 2008 In : Optics Express. 16, 5, p. 3273-3287
Research output: Research - peer-review » Journal article – Annual report year: 2008
Accurate nonlocal theory for cascaded quadratic soliton compression
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Cascaded quadratic soliton compression at 800 nm
Bache, M., Bang, O., Moses, J. & Wise, F. 2007 OSA, Technical Digest, Nonlinear Photonics. p. NWA3
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Coherent imaging of a pure phase object with classical incoherent light
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Designing quadratic nonlinear photonic crystal fibers for soliton compression to few-cycle pulses
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Ghost imaging
Research output: Research - peer-review › Book chapter – Annual report year: 2007

Nonlocal explanation of stationary and nonstationary regimes in cascaded pulse compression
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Nonlocal explanation of stationary and nonstationary regimes in cascaded soliton pulse compression
Bache, M., Bang, O., Moses, J. & Wise, F. W. 2007 In : Optic Letters. 32, 17, p. 2490-2492
Research output: Research - peer-review › Journal article – Annual report year: 2007

Scaling laws for soliton pulse compression by cascaded quadratic nonlinearities
Research output: Research - peer-review › Journal article – Annual report year: 2007

Soliton compression to few-cycle pulses by cascaded quadratic nonlinearities
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Soliton compression to few-cycle pulses using quadratic nonlinear photonic crystal fibers: A design study
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Soliton compression to ultra-short pulses using cascaded quadratic nonlinearities in silica photonic crystal fibers
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007

Tailoring the dispersion properties of photonic crystal fibers
Research output: Research - peer-review › Article in proceedings – Annual report year: 2007
Tailoring the dispersion properties of photonic crystal fibers
Research output: Research - peer-review › Journal article – Annual report year: 2007

Coherent imaging of a pure phase object with classical incoherent light
Research output: Research - peer-review › Journal article – Annual report year: 2006

Coherent imaging of a pure phase object with classical incoherent light
Research output: Research - peer-review › Conference abstract for conference – Annual report year: 2006

Coherent imaging with pseudo-thermal incoherent light
Research output: Research - peer-review › Journal article – Annual report year: 2006

Detection of quantum spatial correlation in High-gain parametric down-conversion
Research output: Research - peer-review › Article in proceedings – Annual report year: 2005

Group-velocity matched nonlinear photonic crystal fibers
Research output: Research - peer-review › Article in proceedings – Annual report year: 2006

Quantum spatial correlations in high-gain parametric down-conversion measured by means of a CCD camera
Research output: Research - peer-review › Journal article – Annual report year: 2006

Second-harmonic generation with zero group-velocity mismatch in nonlinear photonic crystal fibers
Research output: Research - peer-review › Article in proceedings – Annual report year: 2006

Second-harmonic Generation with Zero Group-Velocity Mismatch in Nonlinear Photonic Crystal Fibers
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2006

Tuning quadratic nonlinear photonic crystal fibers for zero group-velocity mismatch
Research output: Research - peer-review › Article in proceedings – Annual report year: 2006

Tuning quadratic nonlinear photonic crystal fibers for zero group-velocity mismatch
Research output: Research - peer-review › Journal article – Annual report year: 2006

Cavity soliton laser based on VCSEL with saturable absorber
Research output: Research - peer-review › Journal article – Annual report year: 2005
Cavity solitons in a VCSEL with saturable absorber
Research output: Research - peer-review › Article in proceedings – Annual report year: 2005

Classical and entangled ghost imaging schemes
Research output: Research - peer-review › Article in proceedings – Annual report year: 2005

Entangled Imaging in the large photon number regime
Research output: Research - peer-review › Journal article – Annual report year: 2005

Ghost imaging with spatial averages: fast and broadband
Research output: Research - peer-review › Article in proceedings – Annual report year: 2005

High resolution ghost image and ghost diffraction experiments with incoherent pseudo-thermal light
Research output: Research - peer-review › Article in proceedings – Annual report year: 2005

High-resolution ghost imaging and ghost diffraction experiments with thermal light
Research output: Research - peer-review › Journal article – Annual report year: 2005

High resolution ghost imaging experiments with classical thermal light
Research output: Research - peer-review › Article in proceedings – Annual report year: 2005

Analysis of elliptically polarized states in vertical-cavity-surface-emitting lasers
Research output: Research - peer-review › Journal article – Annual report year: 2004

Correlated imaging, quantum and classical
Research output: Research - peer-review › Journal article – Annual report year: 2004

Correlated Imaging with macroscopic fields
Research output: Research - peer-review › Journal article – Annual report year: 2004

Ghost Imaging schemes: fast and broadband
Bache, M., Brambilla, E., Gatti, A. & Lugliato, L. A. 2004 In: Optics Express. 12, p. 6067-6081
Research output: Research - peer-review › Journal article – Annual report year: 2004

Ghost imaging using homodyne detection
Research output: Research - peer-review › Journal article – Annual report year: 2004

Ghost imaging with thermal light: comparing entanglement and classical correlation
Research output: Research - peer-review › Journal article – Annual report year: 2004
Simultaneous near-field and far-field spatial quantum correlations in the high gain regime of parametric down-conversion
Research output: Research - peer-review › Journal article – Annual report year: 2004

Single-shot detection of spatial quantum correlation in high-gain parametric down-conversion
Research output: Research - peer-review › Journal article – Annual report year: 2004

Nonclassical statistics of intracavity coupled chi(2) waveguides: The quantum optical dimer
Research output: Research - peer-review › Journal article – Annual report year: 2003

Observation of self-pulsing in singly resonant optical second-harmonic generation with competing nonlinearities
Research output: Research - peer-review › Journal article – Annual report year: 2002

Quantum noise and spatio-temporal pattern formation in nonlinear optics
Bache, M. 2002
Research output: Research › Ph.D. thesis – Annual report year: 2002

Quantum properties of transverse pattern formation in second-harmonic generation
Research output: Research - peer-review › Journal article – Annual report year: 2002

Spatiotemporal structures in the internally pumped optical parametric oscillator
Research output: Research - peer-review › Journal article – Annual report year: 2001

Spiral intensity patterns in the internally pumped optical parametric oscillator
Research output: Research - peer-review › Journal article – Annual report year: 2001

Modification of pattern formation in doubly resonant second
Research output: Research - peer-review › Journal article – Annual report year: 2000

Modification of pattern formation in doubly resonant second-harmonic generation by competing parametric oscillation
Research output: Research - peer-review › Journal article – Annual report year: 2000

Influence of competing parametric oscillation on pattern formation in second harmonic generation
Bache, M., Lodahl, P. & Saffman, M. 1999
Research output: Research › Conference abstract for conference – Annual report year: 1999
Instabilities and localized structures in cavity enhanced $\chi^{(2)}$-nonlinear processes
Bache, M., Lodahl, P. & Saffman, M. 1999
Research output: Research › Conference abstract for conference – Annual report year: 1999

Pattern formation in second harmonic generation with competing parametric oscillation
Lodahl, P., Bache, M. & Saffman, M. 1999
Research output: Research › Conference abstract for conference – Annual report year: 1999

Stationary space-periodic structures with equal diffusion coefficients
Research output: Research - peer-review › Journal article – Annual report year: 1999

Projects:

Advanced femtosecond fiber laser technology for science and applications
Buchmann, T. O., Jepsen, P. U. & Bache, M.
Institut stipendie (DTU)
01/02/2018 → 31/01/2021
Project: PhD

Efficient mid-IR supercontinuum generation in quadratic nonlinear waveguides
Li, G., Bache, M., Moselund, P. M. & Zhou, B.
Marie Curie (EU-stipendium)
01/04/2017 → 31/03/2020
Project: PhD

Nanophotonics devices for ultra-fast nonlinear processes in the infrared
Christensen, S., Bache, M., Torres-Company, V. & Zhou, B.
Institut stipendie (DTU)
01/04/2017 → 16/08/2020
Project: PhD

Supercontinuum generation with rugged femtosecond fibre lasers
Rao Delanthabettu Shivarama, S., Bache, M., Moselund, P. M., Zhou, B. & Bang, O.
Anden EU-finansiering
15/02/2017 → 14/02/2020
Project: PhD

Novel ultrafast mid-IR laser source for spectroscopy
Bache, M., Zhou, B., Petersen, P. B. & Ashihara, S.
01/01/2015 → 30/04/2016
Project: Research

Ultrafast mid-IR nonlinear optics in gas-filled hollow-core photonic crystal fibers
Habib, S., Bache, M., Bang, O., Lægsgaard, J., Biancalana, F. & Joly, N.
Institut stipendie (DTU)
15/04/2014 → 14/06/2017
Project: PhD

Spatial solitons, vortices, and patterns in non-linear optical media
Bache, M., Christiansen, P. L., Bang, O., Rasmussen, J. J., Saffman, M., Tromborg, B., Firth, W. J. & Pedersen, T. G.
DTU, Samfinansiering
01/04/1999 → 08/11/2002
Project: PhD
Hollow-core fibers for high power laser applications
Michieletto, M., Bang, O., Lyngsøe, J. K., Lægsgaard, J., Bache, M., Belardi, W. & Correra, R. A.
Eksternt EU-finansieret
01/01/2013 → 30/09/2016
Project: PhD

Laser frequency standards based on gas-filled hollow-core fibres
Triches, M., Bang, O., Hald, J., Lægsgaard, J., Bache, M., Arlt, J. & Corwin, K.
Eksternt EU-finansieret
01/02/2013 → 02/11/2016
Project: PhD

2-10um mid-infrared supercontinuum light sources
Petersen, C. R., Bang, O., Møller, U. V., Bache, M., Buczynski, R., Dudley, J. M. & Dudley, J. M.
Offentlig finansiering
01/08/2013 → 02/11/2016
Project: PhD

High-intensity terahertz radiation for nonlinear spectroscopy at long wavelengths
Pedersen, P. K., Jepsen, P. U., Bache, M., Hegmann, F. & Keiding, S. R.
Eksternt finansieret virksomhed
01/04/2012 → 18/06/2015
Project: PhD

Femtosecond few-cycle mid-infrared laser pulses
Liu, X., Bache, M., Zhou, B., Bang, O., Jedrkiewicz, O. & Minardi, S.
Institut stipendie (DTU) Samf.
15/10/2012 → 15/06/2016
Project: PhD

Cascaded Quadratic Soliton Compression in Waveguide Structures
Institut stipendie (DTU) Samf.
01/07/2011 → 26/09/2014
Project: PhD

Terabit/s Optical Regeneration
Rege, K. M., Morioka, T., Gallil, M., Oxenløwe, L. K., Bache, M., Bache, M., Schröder, J. & Schröder, J.
Institut stipendie (DTU) Samf.
01/04/2013 → 08/02/2017
Project: PhD

Nonlinear optical properties of ultra-thin metal layers
Lysenko, O., Lavrinenko, A., Bache, M., Mortensen, N. A., Leosson, K. & Shalaev, V. M.
Institut stipendie (DTU)
15/06/2013 → 17/08/2016
Project: PhD

Continuous Wave Supercontinuum Light Sources based on Tapered Photonic Crystal Fibres
Larsen, C., Bang, O., Hansen, K. P., Mattsson, K. E., Bache, M., Alam, S. & Ludvigsen, H.
Institut stipendie (DTU) Samf.
01/08/2010 → 19/03/2014
Project: PhD

Femto-midIR: Femtosecond few-cycle mid-infrared laser pulses
Bache, M., Zhou, B., Wise, Dept. of Applied & Engineering Physics, Cornell University, USA, F. W. & Zeng, X.
**Nanostructured polymer photonic crystal fibers for effective second-harmonic generation**

Bache, M.
Forskningsrådene - STVF
01/06/2005 → 30/06/2008
Project: Research

**COPULCO: Cascaded Optical Pulse Compressor**

Bache, M. & Zeng, X.
Forskningsrådene - STVF
01/06/2012 → 31/05/2015
Project: Research

**Femto-VINIR: Few-cycle femtosecond optical pulses in the visible and near-infrared**

Bache, M., Bang, O., Krolikowski, W., Jepsen, P. U., Cooke, D. & Wise, F. W.
Forskningsrådene - STVF
01/04/2009 → 31/03/2012
Project: Research

**Activities:**

**Ultrafast mid-IR laser pulses - enabling new frontiers in science**

Bache, M. (Invited speaker)
6 Jun 2016
Activity: Talks and presentations › Conference presentations

**Ultrashort and broadband mid-IR pulses: challenges and solutions**

Bache, M. (Invited speaker)
24 Mar 2016
Activity: Talks and presentations › Conference presentations

**Reviews in Physics (Journal)**

Bache, M. (Editor)
1 Jan 2016 → …
Activity: Research › Journal editor

**Ultra-korte laserpulser i fremtidens forskning**

Bache, M. (Speaker)
10 Jun 2010
Activity: Talks and presentations › Conference presentations

**Generating ultra-short energetic pulses with cascaded soliton compression in lithium niobate crystals**

Bache, M. (Speaker)
1 Jan 2010 → …
Activity: Talks and presentations › Conference presentations

**Phase-matching with a twist: Second-harmonic generation in birefringent periodically poled fibers (Journal)**

Bache, M. (Reviewer)
1 Jan 2010 → …
Activity: Research › Peer review of manuscripts