

Curriculum vitae

Name and Surname **BAKULE Pavel**
Phone no. +420-602274246
E-mail pavel.bakule@eli-beams.eu
Czech Republic

Work experience

Period	Nov 19 2019 - NOW
Position	Department 97 Head – Department of Technical Infrastructure and Instrumentation Services (ELI-Beamlines), and Department 91 Deputy Head – Department of laser systems (ELI-Beamlines)
Work description and main areas of responsibility	Leading a research team responsible for development, commissioning and user operation ALLEGRA laser -high repetition rate (1 kHz) femtosecond laser system with high output energy (>100 mJ), including development of control systems. Responsible for ADONIS FSYNC project grant. This includes development of a new FSYNC OPCPA based laser system and of femtosecond precision synchronisation with the ALLEGRA system and research in the area of coherent combination of broadband high energy laser beams. Responsible for the ELI Beamlines facility control systems team, and development and installation of in-vacuum beam distribution systems, experimental technical support team, target development and support laboratories of ELI Beamlines. Preparing detailed requirements for technical specification for large public procurement tenders of laser technology.
Name and address of employer	The Extreme Light infrastructure ERIC ERIC, ELI-Beamlines facility, Za Radnicí 835, 252 41 Dolní Břežany, Česká Republika (Institute of Physics, Czech Academy of Sciences (AV CR v.v.i.), Project ELI beamlines, Na Slovance 2, Praha 8, Česká Republika – Until Dec 31, 2022)
Period	June 2011 – Nov 2019
Position	Department 91 Deputy Head – Department of laser systems (ELI-Beamlines)
Work description and main areas of responsibility	<ul style="list-style-type: none">- Leading a research team responsible for development, commissioning and user operation ALLEGRA laser -high repetition rate (1 kHz) femtosecond laser system with high output energy (>100 mJ), including development of control systems.- Contributes to development of 10 Hz/1.5PW (L3) and 0.016Hz/10PW (L4) laser systems.- Development of femtosecond synchronization system for ELI-Beamlines laser systems- Preparing detailed requirements for technical specification for large public procurement tenders of laser technology.
Name and address of employer	Institute of Physics, Czech Academy of Sciences (AV CR v.v.i.), Project ELI beamlines, Na Slovance 2, Praha 8, Česká Republika
Period	November 2008 → May 2011
Position	Research Scientist - position “ Laser development for muon science ”
Work description and main areas of responsibility	RIKEN-RAL Ultra low energy muon collaboration (including RIKEN, KEK, STFC/ISIS) <ul style="list-style-type: none">- upgrade of experimental beamline and laser system for generation of ultraslow muons;- Development of pulsed, tunable laser system for muSR experiments and support of users.- modelling of ion optics- expert support of users working with muon beams in combination with lasers- development of international collaboration with RIKEN, Japan
Name and address of employer	Science and Technology Facilities Council (STFC), Rutherford Appleton Laboratory, ISIS, Chilton, Oxfordshire OX11 0QX, United Kingdom
Period	October 2003 → October 2008
Position	RIKEN contract researcher in Meson Science Laboratory

Work description and main areas of responsibility	- Research in area of ultra-slow muons using laser ionization of muonium. Development of Lyman- α laser source and experimental apparatus -development and commissioning of muon spectrometer for muSR experiments with ultraslow muons; interdisciplinary laser laboratory for study of magnetic properties of materials and spintronics using combination spin polarized muons and lasers
Name and address of employer	RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan

Period	October 1998 → September 2003
---------------	-------------------------------

Povolání nebo vykonávaná funkce	Posgradual researcher
---------------------------------	-----------------------

Work description and main areas of responsibility	- Development of pulsed solid state laser with final conversion to 122 nm (Lyman- α VUV) at RIKEN muon beamlines - Specification and setup of new of laser laboratory and installation of commercial laser systems, oversight of installation of personal interlock systems
---	---

Name and address of employer	University of Oxford, Clarendon Laboratory, Parks Road, OX1 3PU Oxford, United Kingdom
------------------------------	---

Education

Period	October 1994 – December 1998
---------------	------------------------------

Degree of qualification	Doctor of Philosophy (DPhil.) in Atomic and Laser Physics
-------------------------	--

Main subject	Dissertation title „A Solid State Laser System for Doppler-free Spectroscopy of Muonium” Merton College Senior Scholarship (1994-7).
--------------	---

Name of university	University of Oxford (Merton College a Clarendon Laboratory), United Kingdom
--------------------	---

Period	September 1993 → July 1994
---------------	----------------------------

Qualification	Visiting PhD student at Oxford University (SOROS scholar)
---------------	---

Main subject	Postgradual course in Atomic Physics Experimental development of CW pumped Cr:Forsterite laser.
--------------	--

Name of university	University of Oxford (University College a Clarendon Laboratory), United Kingdom
--------------------	---

Period	September 1992→ September 1993
---------------	--------------------------------

Qualification	PhD student
---------------	-------------

Main subject	Pulsed Nd:YAG amplifier for ranging of satellites . Development of Er:YAG laser for stomatology
Name of university	Fakulta jaderná a fyzikálně inženýrská ČVUT, Břehová 7, 115 19 Praha 1

Period	September 1986→ June 1992
---------------	---------------------------

Qualification	University degree Ing. (equivalent to Masters degree)
---------------	---

Main subject	–State examination in Quantum electronics, Electronics and Electrodynamics – Diploma thesis „Ti:sapphire laser“
--------------	--

Name of University	Fakulta jaderná a fyzikálně inženýrská ČVUT, Břehová 7, 115 19 Praha 1, Czech Republic
--------------------	---

Publications:

F. Schillaci et al., 2022

The ELIMAIA Laser-Plasma Ion Accelerator: Technological Commissioning and Perspectives
QUANTUM BEAM SCIENCE, 6(4), <https://doi.org/10.3390/qubs6040030>

J. Novák et al., 2022

Dual-output kilohertz pump laser for high-energy picosecond OPCPA
OPTICS LETTERS, 47 (19) , pp.4869-4872

Z. Hubka et al. 2021

120 mJ, 1 kHz, picosecond laser at 515 nm
OPTICS LETTERS, Vol.46, Issue 22, pp. 5655-5658

Z. Hubka et al. 2021

Mitigation of laser-induced contamination in vacuum in high-repetition-rate high-peak-power laser systems
APPLIED OPTICS, Vol. 60, Issue 3 , pp.533-538

A. Špaček et al. 2020

Stability mechanism of picosecond supercontinuum in YAG
OPTICS EXPRESS, Vol. 28, Issue 14, pp.20205-20214

A. Špaček et al. 2019

General method of passive optical pulse peak intensity stabilization through controlled self-phase modulation and over-compression
JOSA B-OPTICAL PHYSICS, Vol. 35, issue 10, pp. 2494-2500

R. Boge et al.2018

Robust method for long-term energy and pointing stabilization of high energy, high average power solid state lasers
REVIEW OF SCIENTIFIC INSTRUMENTS, Vol.89 , Issue: 2, Article Number: 023113

J.T.Green, J.A. Naylor et al.2018

Fiber-based front ends for extreme light applications
SPIE FIBER LASERS AND GLASS PHOTONICS: MATERIALS THROUGH APPLICATIONS, Vol. 10683, Article Number: 1068312

L. Indra, F. Batysta et al. 2017

Picosecond pulse generated supercontinuum as a stable seed for OPCPA
OPTICS LETTERS, Vol.42, issue 4, pp. 843-846

B.Rus, P. Bakule et al. 2017

ELI-Beamlines: Progress in development of next generation short-pulse laser systems
SPIE RESEARCH USING EXTREME LIGHT: ENTERING NEW FRONTIERS WITH PETAWATT-CLASS LASERS III, Vol. 10241.

F. Batysta et al. 2016

Broadband OPCPA system with 11 mJ output at 1 kHz, compressible to 12 fs
OPTICS EXPRESS, Vol. 24; issue 16; pp. 17843-17848

J. Novák, J.T. Green et al. 2016

Thin disk amplifier-based 40 mJ, 1 kHz, picosecond laser at 515 nm
OPTICS EXPRESS, Vol. 24; Issue: 6; pp. 5728-5733

J. Novak, P. Bakule, J.T. Green et al. 2015

100 mJ thin disk regenerative amplifier at 1 kHz as a pump for picosecond OPCPA
2015 CLEO PROCEEDINGS

Rus, B.; Bakule, P.; Kramer, D.; et al. 2015

ELI-Beamlines: Development of next generation short-pulse laser systems
RESEARCH USING EXTREME LIGHT: ENTERING NEW FRONTIERS WITH PW-CLASS LASERS Volume: 9515

P. Bakule; O. Sukhorukov; K. Ishida et al. 2015

First accurate experimental study of Mu reactivity from a state-selected reactant in the gas phase: the Mu + H-2{1} reaction rate at 300 K
JOURNAL OF PHYSICS B-ATOMIC MOLECULAR AND OPTICAL PHYSICS Volume: 48 Issue: 4

J.T. Green, J. Novak et al. 2015

Front end for high repetition rate thin disk-pumped OPCPA beamline at ELI-beamlines
SOLID STATE LASERS XXIV: TECHNOLOGY AND DEVICES Volume: 9342

F. Batysta, R. Antipenkov, J.T. Green et al. 2014
Pulse synchronization system for picosecond pulse-pumped OPCPA with femtosecond-level relative timing jitter
OPTICS EXPRESS Volume: 22 Issue: 24 pp. 30281-6

J. Novak, P. Bakule, J.T. Green et al. 2014
Compact thin-disk picosecond regenerative amplifier at 1 kHz with chirped volume Bragg grating compressor
SOLID STATE LASERS XXIII: TECHNOLOGY AND DEVICES Volume: 8959

J.T. Green, J.A.Naylon, T. Mazanec et al. 2014
Front end for ELI-Beamlines' 100 J cryogenically-cooled Yb:YAG multi-slab amplifier with temporal pulse shaping capability
SOLID STATE LASERS XXIII: TECHNOLOGY AND DEVICES Volume: 895

R. Antipenkov, J.T. Green, F. Batysta, et al. 2014
Jitter-compensated Yb:YAG thin-disc laser as a pump for the broadband OPCPA front-end of the ELI-Beamlines system
SOLID STATE LASERS XXIII: TECHNOLOGY AND DEVICES Volume: 8959

P. Bakule; G.A. Beer; D. Contreras; et al. 2013
Measurement of muonium emission from silica aerogel
PROGRESS OF THEORETICAL AND EXPERIMENTAL PHYSICS 10, Article Number: 103C01,

P. Bakule, J. Novák, D. Kramer et al. 2013
Design of kW level picosecond compressor of pump pulses for high power OPCPA
Proceedings of SPIE , Vol. 8780

J. Novák, P. Bakule, J.T. Green; et al. 2013
Thin disk picosecond pump laser for jitter stabilized kHz OPCPA
Proceedings of SPIE Vol: 8780 Art. UNSP 878020

B. Rus, P. Bakule; D. Kramer et al.
ELI-Beamlines laser systems: status and design options
Proceedings of SPIE Volume: 8780 Art. UNSP 87801T

P. Bakule; D.G. Fleming; O. Sukhorukov et al. 2012,
State-Selected Reaction of Muonium with Vibrationally Excited H-2
JOURNAL OF PHYSICAL CHEMISTRY LETTERS, Vol. 3; Issue: 19; pp. 2755-2760

K. Shimomura; P. Bakule; F.L. Pratt et al. 2012,
Photo detachment of negatively charged Muonium in GaAs by laser irradiation
12TH INTERNATIONAL CONFERENCE ON MUON SPIN ROTATION, RELAXATION AND RESONANCE (MUSR2011) Book Series: Physics Procedia, Vol. 30, pp. 224-226

K. Yokoyama; K. Nagamine; K. Shimomura et al. 2012
Detection of Conduction Electron Spin Polarization in n-GaAs by Negative Muonium
12TH INTERNATIONAL CONFERENCE ON MUON SPIN ROTATION, RELAXATION AND RESONANCE (MUSR2011) Book Series: Physics Procedia Vol. 30, pp. 231-234

O. Louchev, P. Bakule, N. Saito et al. 2011
Mechanism and computational model for Lyman-alpha-radiation generation by high-intensity-laser four-wave mixing in Kr-Ar gas
PHYSICAL REVIEW A Volume: 84 Issue: 3 Article Number: 033842

K. Shimomura, P. Bakule, F. L. Pratt, et al., 2010,
Pilot experiment for muonium photo ionization in GaAs
Journal of Physics: Conference Series 225 (2010) 012004 doi:10.1088/1742-6596/225/1/012004

O. Sukhorukov, P. Bakule, Y. Matsuda, S. Kamal, T. Momose, and D. Fleming, 2009
Application of stimulated Raman pumping toward the first study of chemical reaction dynamics of the muonium atom with H₂^{*}
Phys. Status Solidi C 6, No. S1, S263–S266 // DOI 10.1002/pssc.200881345

P. Bakule, O. Sukhorukov et al., 2009,
Toward the first study of chemical reaction dynamics of Mu with vibrational-state-selected reactants in the gas phase: The (v=1) reaction by stimulated Raman pumping
Physica B: Condensed Matter 404, p. 1013-1016

K. Yokoyama, K. Nagamine, K. Shimomura, H.W.K. Tom, R. Kawakami, P. Bakule et al. 2009,
Muons for spintronics: Photo-induced conduction electron polarization in n-type GaAs observed by the muonium method

Physica B: Condensed Matter 404, p. 856-858

P. Bakule, Y. Matsuda, Y. Miyake.; K. Nagamine, et al., 2009,
Prospects for ultra-low-energy muon beam at J-PARC
Nucl. Instr. Meth. A : 600, p. 35-37

P. Bakule; Y. Matsuda; Y. Miyake, et al., 2008,
Pulsed source of ultra low energy positive muons for near-surface mu SR studies
Nucl. Instr. Meth. B: 266 (2), p. 335-346

P. Bakule, Y. Matsuda, M. Iwasaki, Y. Miyake, K. Nagamine, et al., 2006,
Pulsed source of ultra low-energy muons at RIKEN-RAL,
Physica B: Condensed Matter 374, p. 456-459.

Y. Matsuda, P. Bakule, M. Iwasaki, et al., 2006,
Generation of low-energy muons with laser resonant ionization,
Nucl. Phys. B –Proc. Suppl. 155, p. 346-348.

Y. Matsuda, P. Bakule, P. Strasser, K. Ishida, T. Matsuzaki, et al. 2004,
Recent development of a point positive muon source at RIKEN-RAL muon facility,
AIP Conf. proc. 721 "Neutrino Factories and Superbeams", p. 313-136

P. Bakule and E. Morenzoni, 2004,
Generation and applications of slow polarized muons,
Contemporary Physics 45, number 3, p. 203 – 225.

P. Bakule, Y. Matsuda, Y. Miyake, P. Strasser, K. Shimomura, et al., 2003,
Slow muon experiment by laser resonant ionization method at RIKEN-RAL muon facility,
Spectrochimica Acta B, **58**, 1019-1030.

Y. Matsuda, P. Bakule, P. Strasser, T. Matsuzaki, K. Ishida, et al., 2003,
The first observation of slow muon beam at the RIKEN-RAL muon facility,
Physica B, **326**, p. 217-221.

Y. Miyake, K. Shimomura, S. Makimura, Y. Matsuda, P. Bakule, 2002,
Ultra-sensitive detection of hydrogen isotopes by Lyman-alpha RIS,
J. Nucl. Sci. Tech., **39** (4), p. 287-291.

Y. Miyake, K. Kato, S. Makimura, K. Shimomura, Y. Matsuda, P. Bakule, R. Scheuermann, K. Nagamine, 2001
A new method to obtain a 212 nm laser source for Lyman-alpha light with CLBO crystals
Resonance Ionization Spectroscopy 2000, AIP CONFERENCE PROCEEDINGS **584**, p. 285-290.

Y. Miyake, K. Shimomura, Y. Matsuda, R. Scheuermann, P. Bakule, S. Makimura, P. Strasser et al., 2000
Construction of the experimental set-up for ultra slow muon generation by thermal Mu ionization method at RIKEN-RAL
Physica B: Condensed Matter 289, p. 666-669.

V. Mayer, SN Bagayev, P.E.G. Baird, P. Bakule, M.G. Boshier, et al. 2001,
Pulsed laser spectroscopy in muonium and deuterium
Hyperfine Interactions: 127 (1-4), p. 197-200

V. Mayer, SN Bagayev, P.E.G. Baird, P. Bakule, MG Boshier, et al. 2000,
Measurement of the 1s-2s energy interval in muonium
Phys. Rev. Let. 84 (6), p. 1136-1139.

P. Bakule, P.E.G. Baird, M.G. Boshier, et al., 2000,
A chirp-compensated, injection-seeded alexandrite laser
Applied Physics B - LASERS AND OPTICS: **71** (1), p. 11-17.