

**4-th International Workshop
on Laser Physics
(LPHYS'95)**

PROGRAM

August 4 – 9, 1995

Moscow – Kostroma – Plios – Yaroslavl – Uglich – Moscow

Russia



4-th INTERNATIONAL WORKSHOP ON LASER PHYSICS (LPHYS'95)

Organized by:

*General Physics Institute, Russian Academy of Sciences
International Journal "Laser Physics"
FOM - Institute for Molecular and Atomic Physics
Kazan Physics Technical Institute, Russian Academy of Sciences*

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Ministry of Science and Technical Policy of Russian Federation*

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SILAP Co-chairmen: **M.V. Fedorov, H.G. Muller**

LCAO Co-chairmen: **W.P. Schleich, V.P. Yakovlev**

PECS Co-chairmen:

S.R. Hartmann, J.T. Manassah, V.V. Samartsev, I.V. Yevseyev

GENERAL INFORMATION

BACKGROUND

The fourth annual Workshop on Laser Physics is held in Russia, during the Moscow-Kostroma-Plios-Yaroslavl-Uglich-Moscow Volga-river tour aboard of a comfortable river boat "*Konstantin Simonov*".

The boat departs from Moscow at 17.30, August 4, and returns around 12.00-15.00, August 9, 1995.

MEETING FORMAT

LPHYS'95 consists of its general part, the NATO Advanced Research Workshop on Super-Intense Laser-Atom Physics (SILAP IV) and two Seminars: on Laser Cooling and Atom Optics (LCAO), and on Photon Echo and Coherent Spectroscopy (PECS).

PROCEEDINGS

Both invited and contributed papers will be published in a special issue of the international journal "*Laser Physics*". Invited and key-note lectures of SILAP IV will be published in the NATO volume. For any details, please, contact Prof. I.V. Yevseyev (cabin # 352) and Co-Chairmen of the special events Prof. V.M. Yermachenko (LPHYS / general, cabin # 409), Prof. V.P. Yakovlev (LCAO, cabin # 362), Prof. V.V. Samartsev (PECS, cabin # 326), Drs. M.V. Fedorov and H.G. Muller (SILAP, cabins ##414 and 437, respectively) or anyone of them in the room of the Organizing Committee (cabin # 413). See also the information Board on the MIDDLE deck near by the RESTAURANT.

Manuscripts of papers to be published in the Journal Laser Physics can be either given to Prof. I.V. Yevseyev during this trip or mailed to:

**Prof. Igor V. Yevseyev, Department of Theoretical Physics,
Moscow Engineering Physics institute, Kashirskoe Shosse 31,
Moscow, 115409 Russia**

For connection, the e-mail address of the Editorial Board is:

yevseyev@etp.mepl.msk.u

LOCATION OF THE EVENTS

The joint LPHYS/SILAP session (August 4, 17.15 -19.30)- in the "movie hall" (the sun deck);

SILAP sessions (August 5-9)- in the "movie hall" (the sun deck);

LPHYS / general, LCAO, and PECS sessions (August 5-9) -in the "musical hall" (the boat deck);

POSTERS:

SILAP (August 5, 15.00 -16.30; August 7, 9, 15.30- 17.00) -the sun deck;

LPHYS / general (August 6, 15.00- 16.30) -the sun deck;

PECS (August 6, 19.00 - 20.15) -the sun deck;

Organizing Committee: cabin # 413

TIME	Friday, 4		Saturday,5		Sunday, 6	
	SILAP IV	Others	SILAP IV	Others	SILAP IV	Others
7:00			Breakfast A		Breakfast A	
7:30						
8:00				Breakfast B		Breakfast B
8:30						
9:00				LPHYS general		
9:30						
10:00			Time of Sosenky		Excursion Kostroma	
10:30						
11:00						
11:30						
12:00						
12:30						
13:00			Lunch A	LPHYS general	Lunch A	PECS
13:30						
14:00				Lunch B		Lunch B
14:30						
15:00				LPHYS general		PECS,
15:30	Boardening	Coffee break			Coffee break	
16:00						
16:30				Coffee break	Excursion Plios	
17:00	Welcome Remarks (17:15)			LPHYS general		
17:30	JOINT SESSION					
18:00						
18:30				LCAO		
19:00			Dinner A		Dinner A	PECS POSTERS
19:30	Dinner A					
20:00				Dinner B		Dinner B
20:30		Dinner B				
21:00						
21:30						
22:00			Party			
22:30						

TIME	Monday, 7		Tuesday,8		Wednesday, 9			
	SILAP IV	Others	SILAP IV	Others	SILAP IV	Others		
7:00	Breakfast		Breakfast		Breakfast			
7:30	A		A		A			
8:00		Breakfast		Breakfast		Breakfast		
8:30		B		B		B		
9:00		PECS	Excursion Uglich			PECS		
9:30								
10:00	Excursion Yaroslavl						Coffee break	
10:30								
11:00								
11:30								
12:00								
12:30					PECS			
13:00	Lunch	PECS	Lunch		Lunch			
13:30	A		A		A			
14:00		Lunch		Lunch		Lunch		
14:30		B		B		B		
15:00		LCAO		PECS	Arrival			
15:30	Coffee break				Coffee break			
16:00								
16:30		Coffee break		Coffee break				
17:00		LCAO		PECS				
17:30								
18:00								
18:30								
19:00	Dinner				Dinner			
19:30	A				A			
20:00		Dinner		Dinner				
20:30		B		B				
21:00								
21:30								
22:00								
22:30								

"KONSTANTIN SIMONOV" RIVER BOAT DAILY SCHEDULE

August 4, 15.30	Boarding
August 4, 17.30	Departure from Moscow (North River Terminal Khimki)
August 5, 10.00 - 13.00	"Green" stop near the village of Sosenki
August 5, 22.00	Cocktail reception (in the restaurant)
August 6, 09.30 - 13.00	Kostroma
August 6, 16.30- 19.00	Plios. Excursion to the museum of Levitan, the great Russian artist
August 7, 10.00- 13.00	Yaroslavl. Excursion to the Convent
August 8, 09.00 - 11.45	Uglich. Excursion to the Kremlin of Uglich
August 9, 15.00	Arrival to Moscow, North River Terminal

Participants may stay on board until August 10 for a supplementary charge \$20, the breakfast included.

MEALS

The restaurant has only 180 seats. For this reason all the passengers have to be separated for two groups, Group A and Group B. The schedule of meals for these groups is given below. Separation for the groups is organized in the following way:

Group A – SILAP participants and spouses
Group B – LPHYS/general, LCAO, and PECS participants and their spouses.

Breakfast (Group A)	- 07.00 - 08.00	
Breakfast (Group B)	- 08.15 - 09.00	
Lunch {Group A}	- 13.00 - 14.00	
Lunch (Group B)	- 14.15 - 15.00	
Dinner (Group A)	- 19.00 - 20.00	(19.30- 20.30 on August 4)
Dinner {Group B}	- 20.15 - 21.00	(20.45 - 21.30 on August 4)

LOCATION OF THE HALLS AND CABINS:

Cabins ## 401 - 446	BOAT deck
Cabins ## 301 - 362	MIDDLE deck
Cabins ## 201 - 236	MAIN deck
Cabins## 111 -114	LOWER deck
"MOVIE HALL"	SUN deck, the rear part
"MUSICAL HALL"	BOAT deck, the front part
Restaurant	MIDDLE deck, the rear part
BAR	BOAT deck, the rear part
Beer Bar	MIDDLE deck, the front part

SCIENTIFIC PROGRAM

JOINT SESSION

(SILAP, LPHYS/general, LCAO & PECS)

Friday, August 4

CO-CHAIRMEN: **A.M. Dykhne, P.P. Pashinin**

17.15 - 17.30 Welcome Remarks

A.M. Dykhne (Academician, Kurchatov Institute, Russia)
M.V. Fedorov (General Physics Institute, Russia)
I.V. Yevseyev (Deputy Editor-in-Chief of Laser Physics)

1. 17.30 - 18.00 J.H. Eberly (USA)

Propagation of two correlated strong fields in resonant Raman media

2. 18.00 - 18.30 N.N. Naumova (Russia)

Change of spectrum of relativistically strong laser pulses during interaction with plasma

3. 18.30 --19.00 T. Mclltrath (USA)

Nonlinear optics in plasma waveguides

4. 19.00 --19.30 O.G. Kosareva (Russia)

Dynamics of the stimulated Raman scattering of subpicosecond laser pulse in the self-produced plasma

LASER PHYSICS / general

Saturday, August 5

CHAIRMAN **S.A. Gonchukov**

1. 9.00 - 9.15 A. Shelkovnikov, M. Gubin, D. Depatie (France), D. Tyurikov, A. Kireev, E. Koval'chuk (Russia)

New approaches towards high precise optical-microwave frequency standard based on the strong methane lines ($\lambda = 3.3 \mu\text{m}$)

2. **9.15 - 9.30** V.M. Yermachenko, N.V. Naumov, V.N. Petrovskiy, E.D. Protsenko (Russia)

Frequency resonances in a double-mode He-Ne/CH₄ laser with synchronized modes

V.N. Petrovskiy, N.V. Naumov, E.D. Protsenko,
V.M. Yermachenko (Russia)

Intensity resonances in a double-mode He-Ne/CH₄ laser with synchronized modes

3. **9.30 - 9.45** Yu.L. Chuzavkov, V.A. Masiov, K.K. Ondriash, Yu.N. Polivanov, K.A. Prokhorov, L.E. Semenova (Russia)

Observation of the resonant Hyper-Raman scattering of light in CdS crystal using a tunable optical parametric oscillator

CHAIRMAN: **V.M. Yermachenko**

4. **13.00 - 13.20** M. Jelinek, T. Dostalova, C. Fotakis (Czech Republic)
Laser deposition and analysis of biocompatible ceramic films – experiences and overview

5. **13.20 - 13.40** H. Jelinkova, J. Pasta (Czech Republic)
Nd and Er : YAG laser for ophthalmology

6. **13.40 - 13.55** S.A. Gonchukov, Yu.B. Lasarev (Russia)
Dynamics of blood photoreaction on laser irradiation

Yu. Lasarev, S.A. Gonchukov (Russia)

Biomedical applications of the method of intracavity laser refractometry in reflection

7. **13.55 - 14.10** G.P. Kuzmin (Russia)
Ultraviolet laser endocavitary irradiation in combined treatment of patients with lung tuberculosis

CHAIRMAN: **P.P. Pashinin**

8. **15.00 - 15.25** T.D. Raymond (USA)
Studies of injection-seeded optical parametric oscillators

9. **15.25 - 15.50** V.V. Apollonov (Russia)
Semiconductor dyed array phase locked laser systems

10. **15.50 - 16.05** V.V. Kuzminov, S.I. Derzhavin, A.E. Kazakov (Russia)
Noninversion amplification possibility in ruby and alexandrite

11. **16.05 - 16.20** A.M. Akulshin, M. Ohtsu (Japan), S. Ohshima (Japan),
V.L. Velichansky (Russia)

Laser diode with optical feedback based on dispersive properties of atomic lines

12. **16.20-16.35** A. Lukashhev, L. Kulevsky, P. Pashinin (Russia)

Tunable operation of an YSGG : Cr : Er laser

16.35 - 17.00 Coffee break

CHAIRMAN: **K.A. Prokhorov**

13. **17.00 - 17.15** S.A. Chetkin, G.V. Vdovin (Russia)

Intracavity adaptive optics of powerful Nd - YAG Laser

14. **17.15 - 17.30** V.A. Shmakov, V.V. Apollonov, A.M. Prokhorov, A.V. Shmakov
(Russia)

Self-organization and chaos under interaction of light with mater

15. **17.30 - 17.45** V.D. Borman (Russia)

*On influence of laser radiation on surface roughening transition during
the interaction with chemically-active particles*

16. **17.45 - 17.55** B.L. Vasil'ev, K.E. Lapshin, A. F. Suchkov, I. D. Tasmaguiov
(Russia)

Electroionization discharge in $NH_3 : N_2$ mixture

Sunday. August 6

LPHYS / GENERAL POSTERS
(SUN DECK, 15.00 - 16.30)

CHAIRMAN: **V.D. Borman**

1. A.S. Kozlova, S.E. Bogorodsky, F.A. Nikolayev (Russia)

*Experimental studies of reflection abilities of liquid metal targets in vacuum
under impulse neodim laser emission*

2. I.P. Nikolaev, A.V. Larichev (Russia)

Subharmonics generation in the nonlinear optical system with nonlocal interactions

3. Yu.A. Vdovin (Russia)

*Photoabsorption spectra of intense radiation in a medium of three-level atoms
with discrete or autoionizing states*

4. V.V. Yasil'ev, V.L. Velichansky, M.L. Gorodetsky, V.S. Ichenko, I. Hellberg (USA),
A.V. Yarovitsky (Russia)
Laser diode with external microresonator
 5. G.Yu. Nikolaeva, S.A. Gordeev, K.A. Prokhorov (Russia)
The Raman structural study of solid state drawing polyethylenes
 6. I.V. Smetanin, E.M. Belenov, V.A. Isakov, A.P. Kanavin (Russia)
The electrodynamics of high-power ultrashort pulse in Raman-active media
 7. V.V. Kocharovsky, A.A. Belyanin, V.I. Kocharovsky, Yu.M. Mironov (Russia)
Mode superradiance of free electron-hole pairs in semiconductor magneto-optics
 8. S.L. Derzhavin, Y.V. Apollonov, K.H. Kazakov (Russia)
Two wavelength laser plasma heating
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LCAO'95

Saturday, August 5

CO-CHAIRMEN: **N.P. Bigelow** and **V.A. Alekseev**

1. **18.00 -- 18.25** R. Kaiser (France)
Detection of bouncing atoms
2. **18.25 - 18.50** W. Schleich (Germany)
Dynamical localization in atom optics
3. **18.50 - 19.15** L.P. Yatsenko (Ukraine)
Stimulated light pressure on atoms and molecules
4. **19.15 - 19.40** J. Lawall (France)
Three-dimensional subrecoil laser cooling
5. **19.40 - 20.05** G.A. Ryabenko, V.A. Grinchuk, L.A. Grishina, E.F. Kuzin,
M.L. Nagaeva, V.P. Yakovlev (Russia)
Dependence of atom scattering in the field of standing light wave on the distance between atoms and the mirror forming the field

Monday, August 7

CHAIRMAN: **V.P. Yakovlev**

1. **15.00 --15.25** J. Baudon (France)
Stern-Gerlach atomic interferometry (recent progress)
2. **15.25 --15.50** F. Perales (France)
Stern-Gerlach atomic interferometry with H^ and K atoms*
3. **15.50 --16.15** E. Rasel (Austria)
Diffraction on standing light waves - a new atom interferometer
4. **16.15 - 16.40** V. Balykin (Russia)
Atom optics with laser near-fields

16.40 - 17.00 Coffee break

CHAIRMAN: **W.P. Schleich**

5. **17.00 - 17.25** N.P. Bigelow (USA)
6. **17.25 - 17.50** S. Kienle, M. Freyberger (Germany), V.P. Yakovlev (Russia)
Probing the wave function of an atom
7. **17.50-- 18.15** V.G. Minogin (Russia)
Three-dimensional coherent population trapping states of atoms in laser fields
8. **18.15 - 18.40** V.A. Alekseev (Russia)
Quantum limit of laser cooling of the ion in a r.f. trap. Influence of micromotion
9. **18.40 --19.05** D.O. Krylova (Russia)
Micromotion of the ions cooled by laser field in r.f. Paul trap
10. **19.05 - 19.30** B.D. Pavlik (Ukraine), M.A. Olshanii, V.G. Minogin (Russia)
Quantum behavior of ultracold atoms in optical trap
11. **19.30 - 19.50** S. Schaufler, W. Schleich (Germany), V. Yakovlev (Russia)
On the problem of VSCPT laser cooling: asymptotic solution of the Fokker-Plank equation
12. **19.50 - 20.10** V. Yakovlev, E. Perevalov, O. Stovbun (Russia)
Bragg resonance and interference of atoms with self-induced transparent transition in separated light fields

PECS'95

Sunday, August 6

13.00-13.10 Opening of PECS'95

SECTION:
NONLINEAR AND COHERENT INTERACTION OF LIGHT WITH MATTER

CO-CHAIRMEN: **K.M. Salikhov and V.V. Samartsev**

1. **13.10 - 13.40** K.K. Rebane (Estonia)

Zero-phonon line as the cornerstone of single impurity molecule spectroscopy, persistent spectral hole burning and its applications for optical data storage and processing

2. **13.40 - 14.10** M.L. Ter-Mikaelian (Armenia)

Interaction of laser radiation with atoms near the resonances

SECTION:
MAGNETIC ANALOGS OF THE TRANSIENT PHENOMENA

CO-CHAIRMEN: **K.K. Rebane and I.V. Yevseyev**

1. **15.00 - 15.30** K. M. Salikhov (Russia)

Chemical reactions and spin coherence

2. **15.30 - 16.00** F. Gelardi (Italy)

Frequency-domain experimental investigation of spin echo emission

3. **16.00 - 16.30** E. Manykin (Russia)

The photon echo in magnetic system

POSTER SECTION OF PECS'95
(SUN DECK, 19.00 - 20.15)

CHAIRMAN: **A.I. Alekseev**
SECRETARY: **N.N. Rubtsova**

1. A.I. Alekseev and N.A. Korotkova (Russia)

Effect of optical pumping in the magnetization of atoms with the hyperfine level structure

2. B.M. Khabibullin, V.N. Usin and A.M. Shegeda (Russia)
Modulation of photon echo intensity by heat pulses in ruby
 3. S.A. Kozlov and A.A. Korolev (Russia)
On the classical theory of dispersion of high intensive light
 4. A.A. Birukov (Russia)
Influence functional in the theory of coherent and cooperative phenomena
 5. I.I. Popov, I.S. Bikbov (Russia)
The associative properties of the photon echo in the molecular iodine
 6. I.S. Bikbov, I.I. Popov, V.V. Samartsev and I.V. Yevseyev (Russia)
Non-Faraday returning of the polarization vector of the stimulated photon echo in the iodine vapor
 7. S.N. Andrianov, V.V. Samartsev, U.E. Sheibut (Russia)
Coherent spontaneous radiation of Frenkel excitons
 8. T.M. Maevskaya (Russia)
The criterion of distinguishability of quantum superposition states by continuous photodetection
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Monday. August 7.

SECTION:
NONLINEAR AND COHERENT INTERACTION OF LIGHT WITH MATIER

CO-CHAIRMEN: **F. Gelardi and I.S. Osad'ko**

1. **09.00 - 09.30** K. Duppen, D.A. Wiersma and M. Van Burgel (The Netherlands)
Coherent femtosecond optical experiments on localization of one-dimensional excitons
2. **09.30 - 10.00** Y.C. Lee (USA)
Superradiance of elementary excitations in confined geometry
3. **13.00 - 13.30** S.N. Andrianov, V.V. Samartsev (Russia), P.V. Zinoviev and N.B. Silaeva (Ukraine)
Optical superradiance in the crystal of biphenyl doped with pyrene molecules: influence of phonons and possibility of phonon-photon superradiance

Tuesday, August 8

SECTION:
PHOTON ECHO AND PHASE MEMORY

CO-CHAIRMEN: **K. Duppen and E.A. Manykin**

1. **11.45 - 12.15** I.S. Osad'ko, M.V. Stashek (Russia)
Femtosecond photon echo in solids: manifestation of electron-phonon interaction of various types
2. **12.15 - 12.45** R.N. Shakhmuratov, R.N. Khasanshin (Russia)
Interaction of two coherent pulses in crystals with nonlinear dephasing
3. **12.45 - 13.15** V.N. Usin, A.M. Shegeda, V.A. Zuikov, B.M. Khabibullin, V.V. Samartsev (Russia)
Modulation of photon-echo polarization by electric field: pseudo-Stark splitting in $\text{LaF}_3 : \text{Pr}^{3+}$
4. **13.15 - 13.45** M.A. Yakshin (Russia)
Investigation of the phase memory in garnet crystal doped by Eu^{3+} and Tm^{3+}
5. **13.45 - 14.15** G.N. Nikoiaev (Russia)
Photon echo of homogeneous assembly of atoms in electric field

SECTION:
PHOTON ECHO AND COHERENT SPECTROSCOPY

CO-CHAIRMEN: **Y.C. Lee and S.G. Kalenkov**

1. **15.00 - 15.30** V.S. Vasilenko, N.N. Rubtsova, E.B. Hovorostov (Russia)
Dynamic Stark effect manifestations in photon echo
2. **15.30 - 16.00** N.N. Rubtsova, V.S. Vasilenko, E.B. Hovorostov (Russia)
Standing wave photon echo study of velocity dependent collisional relaxation
3. **16.00 - 16.30** V. Akulin, V. Dubovitskii, A. Dykhne, A. Rudavets (Russia)
Coherent evolution of quantum phase space distribution of the bound-free transitions and photon echoes of photodissociation

16.30 - 17.00 Coffee break

SECTION: PHOTON ECHO AND OPTICAL MEMORY

CO-CHAIRMEN: **M.L. Ter-Mikaelian** and **N.N. Rosanov**

1. **17.00 - 17.30** A.A. Kalachov, V.V. Samartsev and V.A. Zuikov (Russia)
The peculiarities of multiple reading of the long-lived photon echo in $\text{LaF}_3 : \text{Pr}^{3+}$ crystal
2. **17.30 - 18.00** S.M. Zakharov (Russia)
Analog and digital optical processing based on the two-pulse photon echo
3. **18.00 - 18.30** V.A. Reshetov (Russia)
The polarization properties of superradiance from the levels with hyperfine structure
4. **18.30 - 19.00** S.G. Kalenkov, N.G. Vlasov, A.V. Sajin (Russia)
Zernicke method in the problem of the phase memory

Wednesday, August 9

SECTION: SOLITONS

CO-CHAIRMEN: **S.M. Zakharov** and **L.S. Vasilenko**

1. **09.00 - 09.30** N.N. Rosanov (Russia)
Laser autosolitons
2. **09.30 - 10.00** S.A. Kozlov and S.V. Sazonov (Russia)
Nonresonant supremely short optical solitons
3. **10.30 - 11.00** V.V. Kozlov and E.E. Fradkin (Russia)
3-dimensional soliton formation in a dense resonant absorbing medium

CHAIRMAN: **V.M. Yermachenko**

1. **11.00 - 11.30** M.S. Bowden (USA)
Local field effects in laser field induced quantum coherent and transient phenomena
2. **11.30 - 12.00** A.P. Nizovtsev (Belarus)
Transient hole-burning and free induction decay as a probe of multi-timescale fluctuations of a reservoir
3. **12.00 - 12.30** O. Kocharovskaya (Russia)
Lasing without inversion in strongly driven atomic systems