

Joby Joseph

Department of Physics

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Areas of Specialization:

- Optics and Photonics covering optical processing using photorefractive, biological and polymer materials, Fourier Optics, holographic data storage, optical pattern recognition, digital holography, optical data security, holographic lithography for photonic crystal fabrication & nano-photonics

Current Areas of Research:

- 3-D interference lithography for photonic crystal structure fabrication
- Digital holographic microscope through improved reconstruction methods
- Ultra-high density holographic data storage and improved search methods
- Holographic solar concentrators

Academic Qualifications:

1. PhD (Physics/Optics), 1992, IIT Delhi.
2. MTech (Applied Optics), 1988, IIT Delhi.
3. MSc (Physics), 1985, Gandhiji Univ.(S.B. College, Changanacherry), Kerala.

Research Experience:

S No	Position	Organization	Period	Research topic
1.	Senior Scientific Officer	Physics Dept., IIT Delhi	Sept. 1992 – March 1993	Photon correlation studies
2.	Post-Doc Fellow	Faculty of Engg., Kobe University, Japan	April 1993 – May 1995	Optical image processing using photorefractives
3.	Post-Doc Fellow	Univ. Massachusetts, Boston, USA	June 1995 – July 1996	Optical computing and processing using bacteriorhodopsin
4.	Lecturer	Physics Dept., IIT Delhi	July 1996 – Dec. 1999	Optical Pattern Recognition, Optical Neural Networks
5.	Assistant Professor	Physics Dept., IIT Delhi	Dec. 1999 – Oct. 2006	Holographic Data Storage, Optical Encryption, Digital Holography
6.	Associate Professor	Physics Dept., IIT Delhi	Oct. 2006 – April '2011	Holographic Data Search, Photonic Crystals, Holographic solar concentrators
7.	Professor	Physics Dept., IIT Delhi	April '2011 – Present	Photonic Crystals, Digital Holography, Optical tweezers
8.	Researcher	Univ. Massachusetts, Boston, USA	June - July 1997 May - July 1998 June - July 2000	Optical information processing using bacteriorhodopsin and polymers
9.	Researcher	Faculty of Engg., Kobe University, Japan	May - July 1999	Optical wave mixing in semiconductor materials
10.	Senior Optical Engineer	Aprilis Inc., MA, USA	Dec. 2002 – Dec. 2003 June - July '04, '05, '06 June – Nov. 2007 July '08, May-Jul '09	Ultra High Density Holographic-Data Storage and Search, Fingerprint Capture Device, Holographic concentrator
11.	Visiting Professor	School of Mech & Aero-Space Engg., NTU, Singapore	June- July 2011	Interference lithography for photonic crystal fabrication
12.	Visiting Professor	EIIRIS, Toyohashi University, Japan	Dec. 2011	Photonics
13	Visiting Professor	BNERC, Toyo Univ., Japan	June 2012	Bio-imaging

Industry Experience:

1. Worked as **Senior Optical Engineer** for **Aprilis Inc., Maynard, MA, USA**.
2. Development of next generation ultra-high density optical data storage technology using holography.
3. Three US PATENTS.

Teaching at IIT Delhi:

1. Optical Instrumentation (M.Tech)
2. Fourier Optics and Optical Image Processing (M.Tech)
3. Optical Sources, Detectors and Photometry (M.Tech)
4. Holography & Information Processing (B.Tech)
5. Optics and Lasers (B.Tech)
6. Electromagnetic Fields and Waves (B.Tech)
7. Physical System Design (B.Tech. Engg. Phys. Lab)
8. Physics Practicals (B.Tech)
9. Physics Laboratory (M.Sc.)
10. Optics Laboratory (M.Tech)

No. of Publications:

• Papers published in international journals	:	82
Papers published in Indian journals	:	15
Papers in international conferences	:	35
Papers in Indian conferences	:	50
Books/journal issues co-edited	:	4
Book articles	:	3
• Invited Talks given	:	40

Thesis Guidance:

• Ph.D.	:	6 completed (2 more supervised) 8 in progress
M.Tech. Projects	:	60
M.Sc. Projects	:	25
B.Tech. Projects	:	20

Details of PhD Thesis Guidance:

• Awarded/Submitted

2004, Dinesh Ganotra, Optical implementation of neural networks for face recognition and fingerprint identification and 3-D object shape measurement, Co-supervisor: K. Singh.

2005, Naveen K. Nishchal, Investigations on Fourier and fractional domain optical encryption techniques, Co-supervisor: K. Singh.

2009, Anith N, Investigations on digital holographic architectures, Co-supervisor: K. Singh.

2010, Bhargab Das, Investigations on high density Holographic data storage and Content-addressable search, Co-supervisor: K. Singh.

2012, Pramod Kumar Investigations on security enhanced optical and digital image encryption schemes, Co-supervisor: K. Singh.

2012 (Thesis submitted), Jolly Xavier: Photonic Crystals through Reconfigurable Optical Phase Engineering.

• Supervised unofficially

2001, G. Unnikrishnan, Investigations on some algorithms and architectures for optical encryption, Supervisor: K.Singh.

2006, Renu John, Investigations on content-addressable Holographic data storage and optical data security, Supervisor: K.Singh.

• In Progress

Shamsheer Ali: Improved phase reconstruction techniques in Digital Holography.

Bhavna Sharma (ISRO, Bangalore): Photonic crystals with engineered defects and applications.

Manoj Kumar Sharma: Optical processing using Optical Vertices, Co-supervisor: P. Senthilkumaran.

Manish Kumar Verma (under IITD-NPL MOU), Optical Metrology using singular optics, Co-supervisor: P. Senthilkumaran, H.C. Kandpal (NPL)

Manish Kumar: Photonic crystals

Jagadeesh K S: Holographic lithography and direct laser writing for photonic crystals

Pankaj Kumar Sahoo: Photonic crystal devices through direct laser writing

S. Fiaz: Photonic circuits

Sponsored Research & Consultancy

1. PI or Co-PI of research projects sponsored by DST, DRDO and IRDE.
2. Consultant to MoserBaer India Pvt. Ltd, for developing holographic data storage facility at MoserBaer.

Patents:

1. **WIPO International Patent Publ. No.: WO/2009/051775**,
Publication date: 23 April 2009, Assignee: STX Aprilis Inc.
David A. Waldman, Joby Joseph and C.J. Butler,
Optical system and method for content addressable search and information retrieval in a holographic data storage system,
2. **United States Patent: 7,411,708**,
Issued: Aug 12, 2008, Assignee: STX Aprilis, Inc.
David A. Waldman and Joby Joseph,
Method and apparatus for phase-encoded homogenized Fourier transform Holographic data storage and recovery,
3. **United States Patent Publication number: US 2008/0123908 A1**,
Publication date: 29 May 2008, Assignee: STX Aprilis Inc.
David A. Waldman, Vincent Fedele, Richard T. Ingwall, Daniel H. Raguin, John S. Berg, Joby Joseph and David L. Kent,
Acquisition of high resolution biometric images,
4. **United States Patent: 5,854,710**,
Issued: Dec 29, 1998, Assigned to: University of Massachusetts.
Devulapalli G. L. N. Rao V, F. J. Aranda, Joby Joseph, J.A. Akkara and M. Nakashima,
Optical fourier processing,

Indian patents applied:

1. Joby Joseph, Shift-cum-angle multiplexed holographic search engine, Indian patent applied to FITT, IIT Delhi.,
2. Jolly Xavier and Joby Joseph, "Single step fabrication of large area complex photonic structures with embedded tunable intrinsic defects," Indian patent applied to Intellectual Ventures through FITT IIT Delhi.

Sponsored Research Projects:

Title	Funding Agency	Amount	Duration	PI & Co-PI
Current:				
UV Interference lithography for photonic structure fabrication	DRDO, IRDE, Dehradun	Rs. 98.58 Lacs	2012-2015	PI: Joby Joseph
Innovative Light Extraction Technology for White OLED	MCIT, DIT	Rs. 165 Lacs	2011-2013	PI: Joby Joseph
Investigation on volume holographic light coupling devices	DST	Rs. 41.75 Lacs	2011-2013	PI: Joby Joseph
Solar energy multifunctional Device with integrated holographic, photovoltaic and photo-electro-chemical components	DST	Rs. 392 Lacs	2011-2013	PI: S. Basu Co-PIs: BR Mehta, AK Ganguli Joby Joseph, S Mukherjee

Completed:

To carry out required studies & prepare status document on Photonic crystals and Metamaterials	DRDO; IRDE, Dehradun	Rs. 9.16 Lacs	2010-2011	PI : Joby Joseph Co-PI : K. Singh
Investigations on optical correlator with high capacity holographic memory	DRDO; IRDE, Dehradun	Rs. 43.41 Lacs	2006-2009	PI : Joby Joseph Co-PI : K. Singh
Investigations on Encrypted Optical Correlator for Data Security	DRDO	Rs. 24 Lacs	2003-2006	PI : Joby Joseph Co-PI : K. Singh
Development of FPGA based Hybrid Optical Correlator	DRDO; IRDE, Dehradun	Rs. 43 Lacs	2006-2008	PI : Subrat Kar Co-PIs: S. Chaudhary & Joby Joseph
Development of a compact/portable hybrid optical correlator for machine vision applications (finger print identification)	DST	Rs. 37.40 Lacs	1999-2003	PI : K. Singh Co-PI : Joby Joseph
Investigations on optical pattern recognition through optimized correlation techniques.	DRDO; IRDE, Dehradun	Rs. 20 Lacs	1999-2002	PI : K. Singh Co-PI : Joby Joseph

Consultancy Projects:

Holographic plane-wave Set-up & Holography lectures	Moser Baer India Pvt. Ltd.	Rs. 2 Lacs	6 months (April-Oct. '06)	PI : Dr. Joby Joseph Co-PI : Prof. K. Singh
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LIST OF PUBLICATIONS

Publications in International Journals:

Sl No.	Name of authors	Title of paper	Name of Journal, Volume, Year and page
1.	Jolly Xavier, Raktim Dasgupta, Sunita Ahlawat, Joby Joseph , and Pradeep Kumar Gupta	Three Dimensional Optical Twisters-driven Helically-Stacked Multi-layered Microrotors	Appl. Phys. Lett. 100 (2012) 121101
2.	Manish Verma, Stuti Joshi, Nandan S. Bisht, H. C. Kandpal, P. Senthilkumaran, and Joby Joseph	Effect of surface plasmons on spectral switching of polychromatic light with Au-double-slit	JOSA A 29 (2012)195-199
3.	Samsheerali P T, Bhargab Das and Joby Joseph	Quantitative phase contrast imaging using common-path in-line digital holography	Opt. Commun. 285 (2012) 1062-1065.
4.	Jolly Xavier, Sunil Vyas, P. Senthilkumaran, and Joby Joseph	Complex 3D Vortex Lattice Formation by Phase-Engineered Multiple Beam Interference	Int'l. JI. of Optics , (2012) Article ID 863875.
5.	Pramod Kumar, Joby Joseph, and Kehar Singh	Known-plaintext attack-free double random phase-amplitude optical encryption: Vulnerability to impulse function attack	J. Opt. (IOP) 14 (2012) 045401.
6.	Pramod Kumar, A. Kumar, Joby Joseph, and Kehar Singh	Vulnerability of the security enhanced double random phase-amplitude encryption scheme to point spread function attack	Opt. & Lasers in Eng. 50 (2012) 1196-1201
7.	Manoj Kumar Sharma, Joby Joseph, P. Senthilkumaran	Effect of aberrations in vortex spatial filtering	Opt. & Lasers in Eng. 50 (2012) 1501-1507
8.	Jolly Xavier, and Joby Joseph	Tunable Complex Photonic Chiral Lattices by Reconfigurable Optical Phase Engineering	Opt. Lett. 36 (2011) 403-405.
9.	Jolly Xavier, Sunil Vyas, P. Senthilkumaran, C. Denz, and Joby Joseph	Sculptured 3D twister superlattices embedded with tunable vortex spirals	Opt. Lett. 36 (2011) 3512-3514.
10.	Manoj Kumar Sharma, Joby Joseph and P Senthilkumaran	Selective edge enhancement using anisotropic vortex filter	Appl. Opt. , 50 (2011) 5279-5286.
11.	Pramod Kumar, Joby Joseph , and Kehar Singh	Optical image encryption using Jigsaw transform for silhouette removal in interference-based methods, and decryption with a single SLM	Appl. Opt. , 50 (2011) 1805-1811.
12.	Kaushal, H, Kumar, V, Dutta, A, Aennam, H, Jain, VK, Kar, S and Joseph, J.	Experimental Study on Beam Wander Under Varying Atmospheric Turbulence Conditions	IEEE Photon. Technol. Lett. 23 (2011) 1691-1693
13.	Joby Joseph , Alpana Bhagatji, and Kehar Singh	Content-addressable holographic data storage system for invariant pattern recognition of gray-scale images	Appl. Opt. , 49 (2010) 471-478.
14.	Jolly Xavier, Martin Boguslawski, Patrick Rose, Joby Joseph , and Cornelia Denz	Reconfigurable Optically Induced Quasicrystallographic Three-Dimensional Complex Nonlinear Photonic Lattice Structures	Adv. Materials. 22/3 (2010) DOI: 10.1002/adma.200901792
15.	Bhargab Das, Joby Joseph , and Kehar Singh	Reliability of content-addressable data search in a defocused volume holographic data storage system	Appl. Opt. , 49 (2010) 781-789.
16.	Pramod Kumar, Joby Joseph , and Kehar Singh	Holographic encryption system in the Fresnel domain with convergent random illumination	Opt. Engg. , 49 (2010) 095803.
17.	Pramod Kumar, Joby Joseph , and Kehar Singh	Optical image encryption based on interference under convergent random illumination	Jl. of Optics , 12 (2010) 095402.
18.	Anith Nelleri, Joby Joseph , and Kehar Singh	Phase reconstruction in lensless digital in-line holographic microscopy.	Opt. & Lasers in Engg. , 48 (2010) 27-31.
19.	Julian Becker; Jolly Xavier; Martin Boguslawski; Patrick Rose; Joby Joseph ; Cornelia Denz,	Optically induced three-dimensional photonic lattices and quasi-crystallographic structures,	Proc. SPIE , 7712 (2010) DOI: 10.1117/12.855930.
20.	Bhargab Das, Joby Joseph , and Kehar Singh,	Reliable Data Search in a Holographic Search Engine with Defocused Recording,	Biomed. Opt., OSA Technical Digest (CD) (2010), paper JMA27.
21.	Anith Nelleri, Joby Joseph , and Kehar Singh	Securing complex and multi-plane data in a lens-less digital holographic information system that uses position-phase-shifting geometry	Opt. & Laser Techn. 42 (2010) 366-376
22.	Jolly Xavier, Patrick Rose, Bernd Terhalle, Joby Joseph , and Cornelia Denz	Three-dimensional optically induced reconfigurable photorefractive nonlinear photonic lattices	Opt. Lett. 34 (2009) 2625-2627
23.	Bhargab Das, Joby Joseph , and Kehar Singh	Phase image based sparse gray level data pages for holographic data storage	Appl. Opt. , 48 (2009) 5240-5250
24.	Bhargab Das, Sunil Vyas, Joby Joseph , P. Senthilkumaran, and Kehar Singh	Transmission type twisted-nematic liquid-crystal display for three gray level phase modulated holographic data storage systems	Opt. Lasers Eng. 47 (2009)1150-1159
25.	Bhargab Das, Joby Joseph , and Kehar Singh	Phase modulated gray scale data pages for digital holographic data storage	Opt. Commun. 282 (2009) 2147-2154
26.	Bhargab Das, Joby Joseph , and Kehar Singh	Improved data search by zero-order (dc) peak filtering in a defocused volume holographic content-addressable memory	Appl. Opt. 48 (2009) 55-63
27.	Pramod Kumar, Joby Joseph , and Kehar Singh	Impulse attack-free four random phase mask encryption based on a 4-f optical system	Appl. Opt. 48 (2009) 2356-2363
28.	Pramod Kumar, Joby Joseph , and Kehar Singh	Impulse attack free double-random phase encryption scheme with randomized lens phase functions	Opt. Lett. 34 (2009) 331-333

29.	Bhargab Das, Joby Joseph and K. Singh	Material saturation in photopolymer holographic data recording and its effects on bit-error-rate and content-addressable search	Opt. Commun. 282 (2009) 177-194
30.	Bhargab Das, Joby Joseph and K. Singh	Material saturation in photopolymer holographic data recording and its effects on bit-error-rate and content-addressable search	Opt. Commun. 282 (2009) 177-194
31.	Anith Nelleri, Joby Joseph , and Kehar Singh	Lens-less complex data encoding for digital holographic whole information security	Opt. Eng. 47 (2008) 115801
32.	Pramod Kumar, Joby Joseph , and Kehar Singh	Double random phase encryption with in-plane rotation of modified Lohmann's second type system in anamorphic fractional Fourier domain	Opt. Eng. 47 (2008) 117001
33.	Ashish Dwivedi, Jolly Xavier, Joby Joseph , and Kehar Singh	Formation of All the Fourteen Bravais Lattices of 3-D Photonic Crystal Structures by a Dual Beam Multiple Exposure Holographic Technique	Appl. Opt. 47 (2008) 1973-1980
34.	Anith N, Joby Joseph and Kehar Singh	Digital Fresnel field encryption for three-dimensional information security	Opt. Engg. 46/4 (2007) 045801
35.	Bhargab Das, Joby Joseph and K. Singh	Performance analysis of content addressable search and Bit Error Rate (BER) characteristics of defocused volume holographic data storage system	Appl. Opt. (2007) 46 (2007) 5461-5470
36.	Joby Joseph and D. A. Waldman	Homogenized FT holographic data storage using phase SLM and methods for recovery of data from phase image	Appl. Opt. 45 (2006) 6374-6380
37.	Anith N, Unnikrishnan G, Joby Joseph , and Kehar Singh	Three-dimensional object recognition from digital Fresnel hologram by wavelet matched filtering	Opt. Commun. 259 (2006) 499-506
38.	Anith N, Joby Joseph and Kehar Singh	Recognition and classification of three-dimensional phase objects by digital Fresnel holography	Appl. Opt. , 45 (2006) 4046-4053
39.	A. Nelleri, U. Gopinathan, J. Joseph and K. Singh	Wavelet based three-dimensional object recognition using single off-axis digital Fresnel hologram	Proc. SPIE 5827 (2005) 30-37
40.	Renu John, Joby Joseph , and Kehar Singh	A new balanced-modulation code for phase-image-based holographic data storage system	J. Opt. A Pure and Appl. Opt. 7, (2005) 391-395
41.	Renu John, Joby Joseph and Kehar Singh	Holographic data storage using phase modulated pixels	Opt. Lasers Engg. 42, (2005) 183-194
42.	Renu John, Joby Joseph , and Kehar Singh	An input-data page modulation scheme for content-addressable holographic digital data storage	Opt. Commun. 249, (2005) 387-395
43.	Renu John, Joby Joseph and Kehar Singh	Content-addressable holographic data storage using hybrid ternary modulation in a Twisted Nematic Liquid Crystal Spatial Light Modulator	Opt. Rev. 12, (2005) 155-160
44.	Renu John, Joby Joseph , and Kehar Singh	Phase-image-based content-addressable holographic data storage with security	J. Opt. A Pure and Appl. Opt. 7, (2005) 123-128
45.	Renu John, Joby Joseph and Kehar Singh	Phase-image-based content-addressable holographic data storage	Opt. Commun. 232, (2004) 99-106
46.	D. Ganotra, Joby Joseph , and Kehar Singh	Modified geometry of ring-wedge detector for sampling Fourier transform of fingerprints for classification using neural networks	Opt. Lasers Eng. 42 (2004) 167-177
47.	D. Ganotra, Joby Joseph , and Kehar Singh	Object reconstruction in multilayer neural network based profilometry using grating structure comprising two regions with different spatial periods	Opt. Lasers Eng. 42 (2004) 179-192
48.	N. K. Nishchal, Joby Joseph , and Kehar Singh	Fully phase encrypted memory using cascaded extended fractional Fourier transform	Opt. Lasers Eng. 42 (2004) 141-151
49.	N. K. Nishchal, Joby Joseph , and Kehar Singh	Securing information using fractional Fourier transform in digital holography	Opt. Commun. 235 (2004) 253-259
50.	D. Ganotra, Joby Joseph , and Kehar Singh	Second- and first-order phase-locked loops in fringe profilometry and application to neural networks for phase-to-depth conversion	Opt. Commun. 217(2003) 85-96
51.	N. K. Nishchal, Joby Joseph , and Kehar Singh	Optical phase encryption by phase contrast using electrically addressed spatial light modulator	Opt. Commun. 217 (2003) 117-122
52.	N. K. Nishchal, Joby Joseph , and Kehar Singh	Optical encryption using cascaded fractional Fourier transform	Opt. Mem. Neural Net. 12 (2003) 139-145
53.	N. K. Nishchal, Joby Joseph , and Kehar Singh	Fully phase encryption using fractional Fourier transform	Opt. Eng. 42 (2003) 1583-1588
54.	N. K. Nishchal, G. Unnikrishnan, Joby Joseph , and Kehar Singh	Optical encryption using localized fractional Fourier transform	Opt. Eng. 42 (2003) 3566-3571
55.	D. Ganotra, Joby Joseph and Kehar Singh	Neural network based face recognition by using diffraction pattern sampling with a digital ring-wedge detector	Opt. Commun. , 202 (2002) 61-68
56.	D. Ganotra, Joby Joseph , and Kehar Singh	Profilometry for the measurement of three-dimensional object shape using radial basis function, and multi-layer perceptron neural networks	Opt. Commun. 209 (2002) 291-301
57.	G. Unnikrishnan, Joby Joseph and K. Singh	Fractional Fourier domain encrypted holographic memory using an anamorphic optical system	Appl. Opt. 40 (2001) 299-306
58.	Dinesh Ganotra, Joby Joseph and Kehar Singh	Performance of Joint Transformation Correlator-Based Optical Neural Network for Face Recognition	Optical Memory and Neural Networks , 10 (2001) 81-90

59.	G.Unnikrishnan, Joby Joseph and K. Singh	Optical encryption by double random phase encoding in the fractional Fourier domain	Opt. Lett. 25, (2000) 887-889
60.	K.S.Dharamsaktu, Joby Joseph and K. Singh	One-dimensional laser beam steering using frequency detuning in two-wave mixing with a BaTiO ₃	Opt. & Lasers in Eng. 33 (2000) 423-429
61.	G. Unnikrishnan, Joby Joseph and K. Singh	A non-zero order joint transform correlator for space-variant pattern recognition	Opt. Commun. , 171 (1999) pp 149-158
62.	G.Unnikrishnan, Joby Joseph and K. Singh	A non-zero order joint transform correlator using random phase function in the input plane	Proc. SPIE , Vol. 3729, (1999) pp 51-56
63.	G.Unnikrishnan, Joby Joseph and K. Singh	Optical encryption system using spatial light modulators	Proc. SPIE Vol. 3740 (1999) pp 525-528
64.	Joby Joseph , F.J. Aranda and D.V.G.L.N. Rao	Optical implementation of wavelet transform by using bacteriorhodopsin film as an optically addressed spatial light modulator	Opt. & Photon News (Dec. 1999)
65.	Joby Joseph , F.J. Aranda and D.V.G.L.N. Rao	Optical implementation of wavelet transform by using bacteriorhodopsin film as an optically addressed spatial light modulator	Appl. Phys. Lett. 73 (1998) 1484-1486
66.	G.Unnikrishnan, Joby Joseph and K. Singh	Optical encryption system that uses phase conjugation in a photorefractive crystal	Appl. Opt. 37, (1998) 8181-8186
67.	R. Tripathi, Joby Joseph and K. Singh	Pattern discrimination using wavelet filters in a photorefractive joint-transform correlator	Opt. Commun. 143 (1997) 5-10
68.	Joby Joseph , F.J. Aranda, D.V.G.L.N. Rao, and B.S. Decristefano	Optical computing and information processing with a protein complex	Opt. Mem. & Neural Networks , 6 (1997) 275-285
69.	Joby Joseph , F.J. Aranda, D.V.G.L.N. Rao, J.A. Akkara and M. Nakashima	Optical Fourier processing using photoinduced dichroism in a bacteriorhodopsin film	Opt. Lett. 21 (1996) 1499-1501
70.	Joby Joseph , T. Oura and T. Minemoto	Optical implementation of Wavelet Transform by use of dynamic holographic recording in photorefractive material	Appl. Opt. 34 (1995) 3997-4003
71.	Joby Joseph	Wave- mixing in photorefractives for image processing applications	OPCOM News (Japan) 11 (1994) 5
72.	S. Chopra, S.K. P. Bhat, Joby Joseph , S. Rai and J. Rai	Experimental investigation of source correlations in time domain	Opt. Commun. 109 (1994) 205-208
73.	Joby Joseph , K. Kamra, K.Singh and P.K.C. Pillai	Real-time image processing using selective erasure in photorefractive two-wave mixing	Appl. Opt. 31 (1992) 4769-4772
74.	Joby . Joseph , K.Singh and P.K.C. Pillai	Beam fanning versus optimization of signal beam amplification by two-wave mixing in photorefractive BaTiO ₃	Optik 91 (1992) 89-92
75.	Joby Joseph , K. Kamra, K. Singh and P.K.C. Pillai	Effect of strong pump depletion on two-beam coupling in photorefractive BaTiO ₃ at 442nm	J. Mod. Opt. 39 (1992) 845-852
76.	Joby Joseph , K.Singh and P.K.C. Pillai	Cumulative nature of two-wave mixing and its dependence on crystal orientation	Appl. Phys. Lett. 59 (1991) 1404-1406
77.	Joby Joseph , K.Singh and P.K.C. Pillai	Anisotropic conical scattering in photorefractive BaTiO ₃ : Diffraction efficiency measurements	Opt. & Laser Techn. 23 (1991) 338-340
78.	Joby Joseph , K.Singh and P.K.C. Pillai	Crystal orientation dependence of SNR for signal beam amplification in photorefractive BaTiO ₃	Opt. & Laser Techn. 23 (1991) 237-240
79.	Joby Joseph , K.Singh and P.K.C. Pillai	Spatial amplification via photorefractive two-beam coupling: Real-time image processing using controllable erasure of Fourier spectrum	Opt. Commun. 85 (1991) 389-392
80.	Joby Joseph , P.K.C. Pillai and K.Singh	High gain, low noise signal beam amplification in photorefractive BaTiO ₃	Appl. Opt. 30 (1991) 3315-3318
81.	Joby Joseph , P.K.C. Pillai and K.Singh	A novel way of noise reduction in image amplification by two-beam coupling in photorefractive BaTiO ₃ crystal	Opt. Commun. 80 (1990) 84-88
82.	Joby Joseph , K.Singh and P.K.C. Pillai	A new phase conjugate scheme for one way imaging through phase distorting media	Appl. Phys. B. 51 (1990) 219-221

Book Articles:

1. J. Joseph, P.K.C. Pillai and K. Singh, "Optical Computing and Image Processing: Role of Nonlinear Photorefractive Crystals", in "Novel Applications of Lasers" Ed. H.B. Bohidar (Wiley Eastern Ltd., New Delhi, 1994) 59-128.
2. D.V.G.L.N. Rao, D. Narayan Rao, F.J. Aranda and J. Joseph, "Optical information processing with bacteriorhodopsin". in "Electrical and Optical Polymer Systems: Fundamentals, Methods and Applications", Eds. D.L. Wise, D.J. Trantolo, T.M. Cooper, G.E. Wnek and J.D. Gresser (Marcel Dekker, 1998).
3. K. Singh and J. Joseph, "Photorefractive Crystals and Their Applications" in 'Nonlinear Optics and Laser Spectroscopy' Ed. S.C. Abbi and S.A. Ahmed (Narosa Publishing Pvt. Ltd., New Delhi, 2001).

Invited Talks

1. "Holographic Lithography for Photonic Structure fabrication" Bio-Nano Electronics Research Center, Toyo University, Japan, 21 June. 2012.
2. "Holographic Lithography for Photonic Structure fabrication" EIIRIS, Toyohashi Univ. Technology, Japan, 15 Dec. 2011.
3. "Reconfigurable Holographic Lithography for Photonic Structure fabrication" School of Mechanical and Aerospace Engineering, NTU, Singapore, 16 July. 2011.
4. "Holographic nano-photonic structures and applications" India-Singapore physics Symposium, NUS, Singapore, 25 Feb. 2011.
5. "Reconfigurable Holographic Lithography for Photonic Structure fabrication" 9th Euro-American Workshop on Information Optics (WIO 2010), Helsinki, Finland July 12-16, 2010
6. "TB Memory Optical Disks and Optical Circuits" Inaugural address at Conference on Advances in Computing, Nehru College, Coimbatore, 5 Feb. 2010.
7. "TB Memory Optical Disks and Optical Circuits" LUMENS 2010, Hansraj College, Delhi, 4 Feb. 2010.
8. "Fabrication of 3-D photonic crystal and quasi crystal structures through 3-D interference" DRDO Photonics Meet, Delhi, 17 Jan. 2010.
9. "3-D Photonic structures through holographic lithography" LASERFEST, ISP, CUSAT, Cochin, 4 Jan. 2010.
10. "Charge Coupled Devices" Nobel Prize 2009 Lectures, IIT Delhi, 13 Nov. 2009.
11. "3-D Photonic structures through holographic lithography" Dayal Singh College, Delhi, 27 Oct. 2009.
12. "Optical disks of TB memory" Resonance, Phys. Dept, IIT Delhi, 1 April 2009.
13. "3-D Photonic structures through holographic lithography" ICICT, Univ. Kerala, Trivandrum, 27 Feb. 2009.
14. "3-D Interference for Photonic Structures Fabrication" Conference on Nanophotonics, Phys. Dept., CUSAT, 11 Oct. 2008
15. "Photopolymers for Holographic Data Storage & Photonic Crystals Generation" Conference on Photonic Polymers, BITS Pilani, 4 April 2008.
16. "Holographic Search Engine" Technical University Berlin, Germany, 29 May 2007.
17. "Holography: Data Storage and Photonic Crystal fabrication", National Conf. on Engg. Optics, Meerut University, 15 April 2007.
18. "Holography: Data Storage and Photonic Crystal fabrication", NCOL-2007, Univ. Kerala, 10 April 2007.
19. "Holography: Data Storage and Search Engine, Photonic Crystal fabrication", SERC School, Delhi University, 30 March 2007.
20. "Nano-Photonics" Nano-Technology Workshop, IIT Delhi, 18 March 2007.
21. "Holography: Data Storage and Search Engine, Photonic Crystal fabrication", OSI Annual Meeting, Baroda University, 2 March 2007.
22. "Holographic Optical Memory" SERC School, Calcutta University, 21 Dec. 2006.
23. "Digital Holographic Disk and Holographic Search Engine" Photonics 2006, Hyderabad, 16 Dec. 2006.
24. "SLM Modulation Techniques for Improved Holographic Search" Indo-UK Conf., IIT Roorkee, 27 Aug. 2006.
25. "Data input techniques for holographic memory with search and data recovery methods" International Conference on Applications of Photonic Technology 'Photonics North 2006', Quebec, Canada, 7 June 2006.
26. "Next Generation Optical Data Storage" I²TECH, IIT Delhi, 22 April 2006.
27. "Colorimetry", Workshop on Photometry and LEDs, ARAI, Gurgaon, 20 Jan. 2006.

28. "Holography Basics, Optical Image Processing, Holographic Storage", UGC Refresher Course, Department of Optoelectronics, Kerala University, Trivandrum, Kerala, 13&14 October 2005.
29. "Digital Holographic Data Storage", Indraprastha College, New Delhi, 28 April 2005.
30. "Holographic Data Storage and Search" Moser Baer India Pvt Ltd., NOIDA, 12 April 2005.
31. "Holographic Data Storage and Search" Seminar on Recent Trends in Optics, IIT Delhi, 22 December 2004.
32. "Digital Holographic Data Storage", PHOTONICS 2004, Cochin, 11 December 2004.
33. "Digital Holographic Data Storage", LASTEC, Defence Science Center, New Delhi, 7 September 2004.
34. "CD-700MB,DVD-7GB, BlueRay DVD-23GB, What Next?; DHD (Digital Holographic Disk) – 200GB to 1TB !!?", NCPEOS, Meerut University, 7 April 2004.
35. "CD-700MB,DVD-7GB, BlueRay DVD-23GB, What Next?; DHD (Digital Holographic Disk) – 200GB to 1TB !!?", IRDE, Dehradun, 29 March 2004.
36. "Holographic Optical Memory" ONGC Refresher Program, IIT Delhi, 19 February 2004.
37. "End of the road for CDs & DVDs? Holography comes to the rescue!!", Physics Department, IIT Delhi, 22 January 2004.
38. "Optical Data Security & Holographic Memory" MRL, University of Pennsylvania, PA, USA, July 2003.
39. "Optical Encryption" Physics Department, Cochin University of Science & Technology, March 2001.
40. "Optical Wavelet Transforms" ENERGY IT, CES, IIT Delhi, 1 December 2000.

• **Memberships of various committees, etc.**

Member, ITDC, Govt. India, Committee for illumination of national monuments in Delhi.
 Member, CSIR Selection Committee
 Member, DRDO Selection Committee
 Member, Delhi University faculty selection committee
 Member, Technical conference committee, Photonics 2008 Delhi.
 Member, Advisory Board, Asian Journal of Physics
 Member, PARC committee on Photonics Program of DRDO, IRDE, Dehradun, "Development of night vision device based on optical amplification"
 Member, Research Project Assessment Committee "Holography", Ministry of Information Technology, Govt. of India.

• **International Collaborations:**

1. Prof. Adarsh Sandhu, EIIRIS, Toyohashi Univ. Technology, Japan
2. Prof. Sakthi Kumar, BNERC, Toyo Univ., Japan.
3. Dr. M. Murukeshan, NTU, Singapore
4. Dr. David Waldman, Sol-Focus, MA, USA.
5. Prof. Cornelia Denz, Univ. of Muenster, Germany.

• **Industry Collaboration:**

1. Dr. Rajiv Jindal, Moser Baer India (P) Ltd., NOIDA.

• **Knowledge of foreign languages.**

Can speak Japanese

• CITATION INDEX of research publications

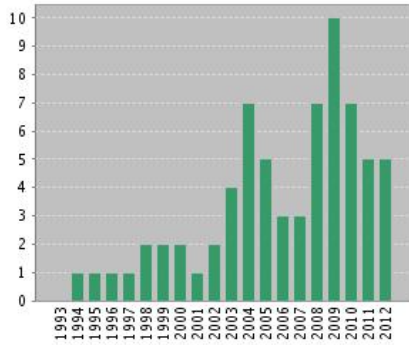
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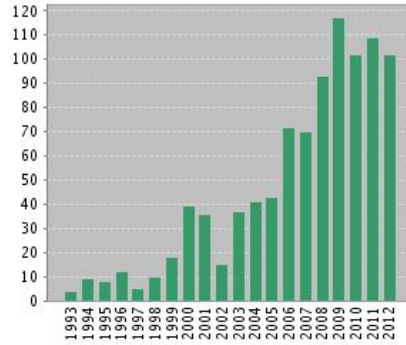
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<input type="checkbox"/> 5. Title: A NOVEL WAY OF NOISE-REDUCTION IN IMAGE AMPLIFICATION BY 2-BEAM COUPLING IN PHOTOREFRACTIVE BATIO3 CRYSTAL Author(s): JOSEPH, J; PILLAI, PKC; SINGH, K Source: OPTICS COMMUNICATIONS Volume: 80 Issue: 1 Pages: 84-88 DOI: 10.1016/0030-4018(90)90512-R Published: DEC 1 1990	2	0	0	1	0	39	1.70
<input type="checkbox"/> 6. Title: Fully phase encryption using fractional Fourier transform Author(s): Nishchal, NK; Joseph, J; Singh, K Source: OPTICAL ENGINEERING Volume: 42 Issue: 6 Pages: 1583-1588 DOI: 10.1117/1.1570429 Published: JUN 2003	5	6	4	2	2	36	3.60