

CURRICULUM VITAE

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Research Field: *Quantum Electronics and Nonlinear Optics*

Education: 1967 - *Ph.D. in Physics&Math.*, ex-USSR Acad. of Sciences, Inst. of Radio-Eng.&Electronics, Moscow, and Gorky St. Univ., ex-USSR.
1955 - 1961 - *M.S. Degree in Physics*, Moscow Physical-Technical Inst. (Moscow Inst. of Physics & Technology), Moscow, ex-USSR.

Biography Listing: "American Men and Women of Science", 1980 and later Edns
"Men of Achievement", XIII Edition (London, UK), 1989 and later
"Intern. Directory of Disting. Leadership", Am. Bio. Inst., 1989 and later
"Who's Who in Sci.&Eng.", Marquis W's/W in America, 1992 and later
"Who's Who in American Education", Marquis W's/W in America
"Who's Who in America", Marquis, 1996 and later
"Who's Who in the World", Marquis 1998 and later

Employment:

Sept. 96 - Jan. 97 *Alexander von Humboldt Prof.*, on sabbatical leave at *the Univ. of Ulm, Quantum Phys. Dept.*, Ulm, D-89069 Germany
Jan. 87 - present *Professor, Electr. & Comp. Eng. Dept., The Johns Hopkins University*, Baltimore, MD 21218.
Sept. 82 - Dec. 86 *Professor, School of Electr. Eng., Purdue Univ.*, W. Lafayette, IN 47907.
Dec. 79 - Aug. 82 *Research Staff Member, Mass. Inst. of Technology*, F. Bitter Natl. Magnet Lab., Cambridge, MA 02139.
June - Sept. 81 *Guest Scientist, Max-Planck-Inst. für Quantenopt.*, 8046 Garching, Germany
1963 - Aug. 1979 *Research Staff Member*, various Institutes of *the ex-USSR Academy of Sciences*, Moscow, ex-USSR.
1961 - 1963 *Research Scientist*, Radio R&D Lab., Moscow District, ex-USSR.

Consulting: Bell Labs, Holmdel, N.J. (1980-81)
Los Alamos Lab., Los Alamos, NM (1981)
Honeywell Res. Center, Minneapolis, MN (1982)

Publications: Co-author of *two monographs*:
"Resonant Nonlinear Interaction of Light with Matter," Springer, 1989 (expanded&updated translation from a Russian edn. of 1976).
"Parametric Oscillators and Frequency Dividers," 1966 ("Sov. Radio," Moscow, in Russian). About 330 technical publications; see list attached.

Teaching: EE 420, Electronic & Optical Properties of Materials (1992)
EE 482, Introduction to Lasers (1993; 95; 97-2001)
EE 725, Quantum Electronics (1993; 95; 98)

EE 726, Nonlinear Optics (1984; 86; 89-91, 1994; 98).
EE 720, Res. Sem. Sol. St., Quant. Electr., Nonl. Opt. (1988-1995,1999)
EE 775, Theory of Nonlinear Systems (1983)
EE 414, Fundamentals of Optical Electronics (1983)
EE 410, Fiberoptics and Photonics (1996; 97)
EE 457, Basics of quantum mechanics for engineers (1998-2001)

- Supervision: Six students obtained M.S. degrees in EE (1985-98)
and advising Three students obtained Ph.D. degrees in EE (1987 and 1990)
Currently: acad. advising of 16 undergrad. students
- Hosting Intern. Prof. B. Akanaev of Kazakh Natl. Univ., Kazakhstan,
Fulbright Scholar;
Guest Scientists: Prof. A. Lago, Univ. Federal de S. Catarina, Brazil;
Dr. I. Marzoli, Italy.
- Citation Rate: About 250/year citations within last 10 years by other workers, according to
"Science Citation Index"
- Funding : PI in the projects funded by AFOSR and other agencies; total personal
funding within last 21 years exceeded \$4,000,000.
- Honors & Awards : 1996, *Alexander von Humboldt Award for senior USA scientists* by the AvH
Foundation of Germany
Fellow of the Opt. Soc. of Am. since 1984
- Activities Phys. Rev. Lett. Phys. Rev. Applied Optics
as a Referee: Optics Letter J. Appl. Phys. Opt. Commun.
Appl. Phys. Letters J. Opt. Soc. Am. Phys. Lett.
IEEE J. Quant. Electron.
Proposal reviewer for NSF, Army Basic Res. Committee, Natl. Res.
Council, DoE, Int. Sc. Found. (Soros Fund), and Bintl. Sc. Fnd. (Israel+US)
- Other Activities: *Panel member* and *Program Committee member* at technical conferences in
the field; *member* of PR Committee of OSA
Invited Speaker at various technical conferences.
Organizer and Presider of a workshop on "*Quantum optical phenomena with
single particles*" at the 1986 Annual Meeting of OSA
Guest Editor for Spec. Issue of IEEE J. Quant. Electr. (July'88) on "*Quant.
and Nonl. Optics of Single Electrons, Atoms, and Ions*".
Member of a Natl. Panel on "Math. for Material Sciences", 1991-92.
Member of ASAT US-USSR Laser Verification Meeting, June'91.
Organizer&coordinator of computer professional network INFO-RUSS
(1200 subs.) for academic community of emigres from ex-USSR.
Edit. Board Member for "J. of Nonlinear Optical Physics & Materials".
Edit. Board Member for Int. Journal "Optics Communications" (1997-99)
- Invited Seminars: About 110 invited lectures and seminars within the last 21 years at various
Universities and govern. & industrial labs in the USA (including MIT,
Princeton, Bell Labs, IBM, GTE and others) and abroad (Canada, France,
Germany, Italy, Israel, Spain, England, Belgium, and Russia).
- Profess. Societies Optical Society of America (*Fellow*)
Membership: The American Physical Society (Member)
- Citizenship: US citizen. (Born: 1938 in the ex-USSR; immig. to the US in 1979).
- Languages: English, Russian (native).

Publications of A. E. Kaplan

Research Books and Book Contributions

Work done in the ex-USSR:

- [1] A. E. Kaplan, Yu. A. Kravtsov and V. A. Rylov, "*Parametric oscillators and frequency dividers*," Monograph, publ. by "Sov. Radio," Moscow, 1966 (in Russian).
- [2] A. E. Kaplan, "On distribution functions conserved upon the transformation from one inertial reference frame to another," in "*Einstein Coll. of Papers. 1973*," edited by V. L. Ginzburg, publ. by "Nauka," Moscow, 1974, p. 396-400 (in Russian).
- [3] V. S. Butylkin, A. E. Kaplan, Yu. G. Khronopulo and E. I. Yakubovich, "*Resonant interactions of light with matter*," Monograph, publ. by "Nauka," Moscow, 1977 (in Russian).

Work done in the USA:

- [4] V. S. Butylkin, A. E. Kaplan, Yu. G. Khronopulo, and E. I. Yakubovich, "*Resonant nonlinear interactions of light with matter*," Monograph, Springer-Verlag, NY, 1989 (translated from Russian, with new material and chapter added).
- [5] A. E. Kaplan and Y. J. Ding, "Nonlinear optics of a single slightly-relativistic electron," *invited* chapter in the book "*Nonlinear Optics and Optical Computing*"; Eds. S. Martellucci and A. N. Chester, Plenum Press, NY, 1990, pp.131-147.
- [6] A. E. Kaplan, P. W. Smith, and W. J. Tomlinson, "Nonlinear waves and switching effects at nonlinear interfaces", *invited* chapter in the book "*Nonlinear Waves in Solid State Physics*", Eds. A. D. Boardman *et al.*, Plenum Press, NY, 1990, pp.93-111.
- [7] A. E. Kaplan, P. W. Smith, and W. J. Tomlinson, " Nonlinear Waves and Switching Effects at Nonlinear Interfaces", (*invited* chapter) in the book "*Nonlinear surface electromagnetic phenomena*", Eds. H.-E. Ponath and G. I. Stegeman, North-Holland Press, 1991, pp. 323-352.
- [8] A. E. Kaplan and P. L. Shkolnikov, "Prospects for X-ray nonlinear optics", in the book "*Nonlinear Optics and Optical Physics* ", I. C. Khoo, J. F. Lam, and F. Simoni, eds., World Scientific, Singapore, 1994, pp. 156-175.
- [9] A. E. Kaplan and P. L. Shkolnikov, "Toward subfemtosecond pulses and solitons", in *Novel optical materials and applications* , Eds. I.-C. Khoo, F. Simoni, and C. Umeton, eds, John Wiley & Sons, Inc., New York, 1997, p. 239-269.
- [10] A. E. Kaplan and P. L. Shkolnikov, "Nonlinear optical effects in a super-dressed two-level atom", in *Research Trends in Nonlinear and Quantum Optics* , Eds. N. Bloembergen, A. Snyder, and V. Stefan, APS (IAP Press, La Jolla, CA, 1997), p. 251-272
- [11] A. E. Kaplan and E. Hudis, "Modulation-induced multi-transparency, high order frequency mixing, and field revival in resonant propagation", in *Research Trends in Nonlinear and Quantum Optics*, Eds. N. Bloembergen, A. Snyder, and V. Stefan, APS (IAP Press, La Jolla, CA, 1997), p. 273-290.
- [12] A. E. Kaplan, S. F. Straub, and P. L. Shkolnikov, "Sub-cycle pulses and field solitons: near- and sub-femtosecond EM-bubbles", in *Beam shaping and control with nonlinear optics*, Eds. Kajar and Reinisch, Plenum Press (1998), pp. 291-317.
- [13] I. Marzoli, I. Bialynicki-Birula, O. M. Friesch, A. E. Kaplan, and W. P. Schleich, "The particle in the box: Intemode traces in the propagator", in "Nonlinear dynamics and computational physics", Ed. V. B. Sheorey (Naroz Publ. House, New Delhi, London, 1999), pp. 135-146.

Serial (Archive) Journal Articles

Work done in the ex-USSR (all the Russian journals in this subsection are referred to by the titles of their *English cover-to-cover translations published in the USA*):

- [1] A. E. Kaplan, "Subharmonic oscillations in a parametric generator with nonlinear capacitance," *Radio Engineering and Electronic Physics* 8:1340-1347 (1963).

- [2] A. E. Kaplan, "Anomalous n-th order resonance in single-circuit having a p-n junction with nonlinear capacitance," *Radio Engineering and Electronic Physics* 9:1424-1425 (1964).
- [3] A. E. Kaplan, "On reflectivity of metallic films at microwave and radio frequencies," *Radio Engineering and Electronic Physics* 9:1476-1481 (1964).
- [4] A. E. Kaplan, "Contribution to the theory of parametric generator of subharmonics up to n-th order, transient processes," *Radio Eng. and Electronic Physics*, 11:1214-1221 (1966).
- [5] A. E. Kaplan, "Phase fluctuations in a two-circuit parametric generator of subharmonics," *Radio Engineering and Electronic Physics* 11:1354-1359 (1966).
- [6] A. E. Kaplan, Comments on "Transmission of electromagnetic waves through thin silver films," by F. A., Korolev and V. I. Gridnev, *Radio Engineering and Electronic Physics* 11:1377-1378 (1966).
- [7] M. E. Zhabotinskii, A. E. Kaplan and Yu. P. Rudnitskii, "The influence of absorption from the metastable level of a sensitizer on the choice of laser pumping mode," *Radiophysics and Quantum Electronics* 11:666-669 (1968).
- [8] A. E. Kaplan, "On generation of high-order subharmonics in the optical range," *Radiophysics and Quantum Electronics* 11:900 (1968).
- [9] A. E. Kaplan, "Bending of trajectories of asymmetrical light beam in nonlinear media," *JETP Letters* 9:33-36 (1969).
- [10] A. E. Kaplan, "'External' self-focusing of light by nonlinear layer," *Radiophysics and Quantum Electronics* 12:692-696 (1969).
- [11] V. S. Butylkin, A. E. Kaplan and Yu. G. Khronopulo, "A possibility of observing self-focusing due to the stimulated Raman scattering," *Radiophysics and Quantum Electronics* 12:1395-1398 (1969).
- [12] V. S. Butylkin, A. E. Kaplan and Yu. G. Khronopulo, "Nonlinear polarizability in resonant interactions of an electromagnetic field with matter," *Sov. Physics JETP* 32:501-507 (1971).
- [13] V. S. Butylkin, A. E. Kaplan, and Yu. G. Khronopulo, "Some features of self-action of light in absorbing media and conditions for observing self-focusing due to resonant absorption," *Sov. Physics JETP* 34:276-283 (1972).
- [14] V. S. Butylkin, A. E. Kaplan, and Yu. G. Khronopulo, "Self-action of light arising from stimulated Raman scattering," *Optics and Spectroscopy*, 31:120-123 (1972).
- [15] A. E. Kaplan, "Exact theory of relaxation of two-level systems in a strong nonmonochromatic field," *Sov. Physics JETP* 38:705-711 (1974).
- [16] A. E. Kaplan, "Dynamics of a two-level system in a strong resonant field with variable frequency and amplitude," *Sov. Phys. JETP* 41:409-413 (1975).
- [17] A. E. Kaplan, "Two-level system in the field of high-power pulse of arbitrary duration," *Sov. J. of Quantum Electronics* 6:728-730 (1976).
- [18] A. E. Kaplan, "Hysteresis reflection and refraction by nonlinear boundary - a new class of effects in nonlinear optics," *JETP Lett.* 24:114-119 (1976).
- [19] A. E. Kaplan, "Theory of hysteresis reflection and refraction of light by a boundary of a nonlinear medium," *Sov. Physics JETP* 45:896-905 (1977).
- [20] A. E. Kaplan, "Criterion of existence of longitudinally inhomogeneous traveling waves in nonlinear electrodynamics," *Sov. J. of Quantum Electronics*, 8:95-97 (1978).
- [21] A. E. Kaplan, "Longitudinally inhomogeneous traveling waves and their role in nonlinear reflection and refraction of light," *Radiophysics and Quantum Electronics* 22: 229-241 (1979).

Work done in the USA:

- [22] A. E. Kaplan, "Bistable reflection of light by an electro-optically driven interface," Appl. Phys. Lett. 38:67-69, (15 Jan. 1981).
- [23] A. E. Kaplan, "Conditions of excitation of new waves (LITW) at nonlinear interfaces and diagram of wave states of the system," IEEE J. Quant. Electr., QE-17:336-340 (March 1981).
- [24] J. E. Bjorkholm, P. W. Smith, W. J. Tomlinson (Bell Labs.) and A. E. Kaplan (MIT), "Optical bistability based on self-focusing," Optics Letters, 6:345-347 (July 1981).
- [25] A. E. Kaplan, "Optical bistability due to mutual self-action of counterpropagating light beams," Optics Letters, 6:360-362 (August 1981).
- [26] A. E. Kaplan, (MIT) and P. Meystre (Max-Planck Institute, Germany), "Enhancement of the Sagnac effect due to nonlinearly induced nonreciprocity," Optics Letters, 6:590-592 (December 1981).
- [27] A. E. Kaplan and P. Meystre, "Directionally asymmetrical bistability in a symmetrically pumped nonlinear ring interferometer," Optics Communications, 40:229-231 (1 January 1982).
- [28] A. E. Kaplan, "Hysteresis in cyclotron resonance based on weak-relativistic mass-effect of the electron," Phys. Rev. Lett., 48:138-141 (18 January 1982).
- [29] P. W. Smith, W. J. Tomlinson, P. J. Maloney (Bell Labs) and A. E. Kaplan (MIT), "Optical bistability at an electro-optical interface," Optics Letters, 7:57-59 (February 1982).
- [30] W. J. Tomlinson, J. P. Gordon, P. W. Smith (Bell Labs.) and A. E. Kaplan (MIT), "Reflection of a Gaussian beam at nonlinear interfaces," Applied Optics, 21:2041-2051 (1 June 1982).
- [31] A. E. Kaplan, "Electro-optic enhancement of the Sagnac effect in ring resonator and related effect of directional bistability," Appl. Phys. Lett. 42: 479-481 (March 15, 1983).
- [32] A. Elci and A. E. Kaplan, "Bistable Cyclotron Resonance," Physics Letters, 97A: 305-308 (September 12, 1983).
- [33] A. E. Kaplan, "Light-induced nonreciprocity, field invariants and nonlinear eigen-polarizations," Optics Letters, 8: 560-562 (November 1983).
- [34] A. E. Kaplan and A. Elci, "Hysteretic (Bistable) Cyclotron Resonance in Semiconductors," Phys. Rev. B, 29: 820-825 (January 15, 1984).
- [35] A. E. Kaplan and S. Datta, "Extreme-ultraviolet and X-ray Emission and Amplification by Non-relativistic Beams Traversing a Superlattice," Applied Physics Letters, 44: 661-663 (April 1, 1984).
- [36] A. E. Kaplan and S. Datta, "Soft X-ray Emission Excited by Electron Beams in a Superlattices," J. Luminescence, 31: 690-692 (1984).
- [37] S. Datta and A. E. Kaplan, "Quantum Theory of Spontaneous and Stimulated Resonant Transition Radiation," Phys. Rev. A., 31: 790-796, (Febr. 1985).
- [38] A. E. Kaplan and C. T. Law, "Isolas in four-wave mixing optical bistability," IEEE J. Quant. Electr., QE-21: 1529-1537 (Sept. 1985).
- [39] A. E. Kaplan, "Multistable self-trapping of light and multistable soliton pulse propagation," IEEE J. Quant. Electr., QE-21: 1538-1543 (Sept. 1985).
- [40] A. E. Kaplan, "Ultimate bistability: hysteretic resonance of a slightly-relativistic electron," IEEE J. Quant. Electr., QE-21: 1544-1549 (Sept. 1985).
- [41] A. E. Kaplan, "Bistable solitons," Phys. Rev. Lett. 55: 1291-1294 (16 Sept. 1985).
- [42]* A. E. Kaplan, "Hysteretic resonance of a slightly relativistic single electron," (* *invited* paper), "Nature," 317: 476-477 (10 October 1985).
- [43] E. M. Wright, P. Meystre (Max-Planck-Inst. Quantenoptik, Germany), W. J. Firth (Heriott-Watt Univ., Scotland, U.K.), and A. E. Kaplan (Purdue Univ.), "Theory of the nonlinear

- Sagnac effect in a fiber-optic gyroscope," *Phys. Rev. A.* 32: 2857-2863 (November 1985).
- [44] A. E. Kaplan, "Relativistic nonlinear optics of a single cyclotron electron," *Phys. Rev. Lett.* 56: 456-459 (February 3, 1986).
- [45] D. R. Andersen, L. A. Kolodziejski, R. L. Gunsher, S. Datta, A. E. Kaplan (Purdue Univ.), and A. V. Nurmikko (Brown Univ.), "Nonlinear Excitonic Absorption in (Zn,Mn)Se Superlattices and ZnSe Films," *Appl. Phys. Lett.* 48: 1559-1561 (9 June, 1986).
- [46] A. E. Kaplan, "Response to Comments by Enns and Rangnekar," *Phys. Rev. Lett.* 57: 779 (11 August, 1986).
- [47] R. H. Enns and S. S. Rangnekar (Simon Fraser Univ., Canada) and A. E. Kaplan (Purdue Univ.), "Robust Bistable Solitons of the Highly-nonlinear Schrödinger Equation," *Phys. Rev. A., Rapid Communications* 35: 466-469 (1 Jan. 1987).
- [48] D. H. Auston (AT&T Bell Labs), T. K. Gustafson (NSF), A. E. Kaplan (Purdue Un.), P. L. Kelley (MIT Lincoln Lab), and Y. R. Shen (Un. California, Berkeley), "Limits on nonlinear optical interaction", in review paper "Research on Nonlinear Optical materials: an assessment", *Applied Optics*, 26 : 211-234 (15 Jan. 1987).
- [49] A. E. Kaplan, "Optical high-order subharmonic excitation of free cyclotron electrons," *Optics Letters*, 12: 489-491 (July 1987).
- [50] F. Marquis, P. Meystre, E. M. Wright (OSC, Univ. Arizona), and A. E. Kaplan (Purdue Univ., JHU), "Dynamics of the optical Freedericksz transition" *Phys. Rev.* 36A: 875-887 (July 15, 1987).
- [51] R. H. Enns, S. S. Rangnekar (Simon Fraser Univ.), and A. E. Kaplan (JHU), "Bistable soliton pulse propagation: stability aspects," *Phys. Rev.* 36A: 1270-1278 (August 1, 1987).
- [52] A. E. Kaplan and Y. J. Ding, "Hysteretic three-photon cyclotron resonance in semiconductors," *Optics Letters*, 12: 687-689 (Sept. 1987).
- [53] Y. J. Ding and A. E. Kaplan, "Isolas in the three-photon optical excitation of a single cyclotron electron," *Optics Letters*, 12: 699-701 (Sept. 1987).
- [54] C. T. Law and A. E. Kaplan, "X-ray transition radiation in a solid-state superlattice: photon-absorption, electron scattering, and radiation optimization," *Optics Letters*, 12: 900-902 (November 1987).
- [55] G. A. Swartzlander and A. E. Kaplan, "Self-deflection of laser beams in a thin nonlinear film," *J. of Am. Opt. Soc. B ("Optical Physics")*, 5: 765-768 (April'88).
- [56] A. E. Kaplan, "Bistable Optical Solitons," *Journal de Physique*, 49: C2,69-74 (June 1988).
- [57] A. E. Kaplan and Y. J. Ding, "Hysteretic and multiphoton optical resonances of a single cyclotron electron," *IEEE J. Quant. Electr.*, 24: 1470-1482 (July 1988).
- [58] Y. J. Ding and A. E. Kaplan, "High-order cyclo-Raman scattering of laser by a single electron," *Phys. Rev. A*, 38: 3109-3112 (Sept. 15, 1988).
- [59] G. A. Swartzlander Jr., H. Yin, and A. E. Kaplan, "Self-bending of a cw laser beam in sodium vapor," *Opt. Lett.*, 13: 1011-1013 (Nov. 1988).
- [60] A. E. Kaplan, "Bistable solitons and their applications in nonlinear optics," *Mathl. Comput. Modeling*, 11: 106-111 (1988).
- [61] C. T. Law and A. E. Kaplan, "Dispersion-related multimode instabilities and self-sustained oscillations in nonlinear counterpropagating waves," *Opt. Letters*, 14: 734-736 (July 15, 1989).
- [62] Y. J. Ding and A. E. Kaplan, "Dynamics and stability of hysteretic and multiphoton optical resonances of a single slightly-relativistic electron," *J. Opt. Soc. Am. B.*, 6: 1299-1305 (July 1989).
- [63] G. A. Swartzlander, H. Yin, and A. E. Kaplan, "CW self-deflection effect in sodium vapor", *J. Opt. Soc. Am. B.*, 6: 1317-1325 (July 1989).

- [64] S. De Nicola (Istituto di Cibernetica, Italy), A. E. Kaplan (J. Hopkins Un.), S. Martellucci, (Un. di Roma, Italy) P. Mormile, G. Pierattini (Ist. di Cib., Italy), and J. Quartieri (Un. di Roma, Italy), "Stable hysteretic reflection of light at a nonlinear interface", *Appl. Phys. B* 49, 441-444 (1989).
- [65] Y. J. Ding and A. E. Kaplan, "Nonlinear magneto-optics of vacuum: second harmonic generation," *Phys. Rev. Lett.* 63: 2725-2728 (18 December 1989).
- [66] D. R. Andersen, D. E. Hooton (U. of Iowa), G. A. Swartzlander (U. of Maryland), and A. E. Kaplan (JHU), "Direct measurements of the transverse velocity of dark spatial solitons", *Optics Letters* 15: 783-785 (July 15, 1990).
- [67] Y. J. Ding and A. E. Kaplan, "Reply to Raizen, Rosenstein, Ford, and Steel comments", *Phys. Rev. Lett.* 65: 2746 (19 Nov. 1990).
- [68] Y. J. Ding, C. L. Guo, G. A. Swartzlander Jr., J. B. Khurgin, and A. E. Kaplan, "Spectral Measurement of the Nonlinear Refractive Index in ZnSe Using Self-Bending of a Pulsed Laser Beam", *Opt. Lett.* 15: 1431-1433 (Dec. 15, 1990).
- [69] C. T. Law and A. E. Kaplan, "Instabilities and amplification of counterpropagating waves in a Kerr nonlinear medium", *J. Opt. Soc. Am. B* 8: 58-67 (Jan. 1991).
- [70] G. A. Swartzlander (JHU), D. R. Andersen, J. J. Regan (U. of Iowa), H. Yin and A. E. Kaplan (JHU), "Spatial dark-soliton stripes and grids in self-defocusing materials", *Phys. Rev. Lett.* 66: 1583-1585 (25 March 1991).
- [71] C. T. Law and A. E. Kaplan, "Dispersion-related amplification in a nonlinear fiber pumped by counterpropagating waves," *Opt. Lett.* 16: 461-463 (1 April, 1991).
- [72] C. L. Guo, Y. J. Ding, S. Li, J. B. Khurgin, C. T. Law, A. E. Kaplan, K.-K. Law, J. Stellato, and L. A. Coldren, "Strong excitonic nonlinearity in a *pin* diode incorporating narrow asymmetric coupled quantum wells," *Opt. Lett.* 16: 949-951 (15 June, 1991)
- [73] P. L. Shkolnikov and A. E. Kaplan, "On the feasibility of X-ray resonant nonlinear effects in plasmas", *Opt. Lett.* 16: 1153-1155 (1 August, 1991)
- [74] Y. J. Ding, C. L. Guo, S. Li, J. B. Khurgin, C. T. Law, A. E. Kaplan, K.-K. Law, J. Stellato, and L. A. Coldren, "Observation of anomalously large blue shift of the excitonic transition and optical bistability in narrow asymmetric coupled quantum wells," *Appl. Phys. Lett.*, 59: 1025-1027 (26 Aug., 1991).
- [75] P. L. Shkolnikov and A. E. Kaplan, "'Discharge Plasma - X-ray Laser" resonant couples for X-ray nonlinear optics," *Phys. Rev. A*, 44: 6951-6953 (15 November, 1991).
- [76] P. L. Shkolnikov and A. E. Kaplan, "X-ray third harmonic generation in plasmas of alkali-like ions", *Opt. Lett.* 16: 1973-1975, (15 December, 1991).
- [77] Y. J. Ding and A. E. Kaplan, "Nonlinear magneto-optical effects in vacuum: inhomogeneity-originated second harmonic generation in a dc magnetic field," *Intern. J. Nonl. Opt. Phys.* 1:51-72 (January 1992).
- [78] P. L. Shkolnikov, A. E. Kaplan (JHU), and M. H. Muendel and P. L. Hagelstein (MIT), "X-ray laser frequency near-doubling and generation of tunable coherent X-rays in plasma", *Appl. Phys. Letts.*, 61:2001-2003 (Oct. 1992).
- [79] P. L. Shkolnikov and A. E. Kaplan, "Proposal for 19.9 mn laser in Li pumped by a non-coherent X-ray pulse" *JOSA B*, 9: 2128-2131 (Nov. 1992).
- [80] R. H. Enns, S. S. Rangnekar (Simon Fraser Univ.), and A. E. Kaplan (JHU), "Optical switching between bistable soliton states: a theoretical review", *Optical & Quantum Electronics*, 24: 1295-1314 (1992).
- [81] A. E. Kaplan, "Eigenmodes of $\chi^{(2)}$ wave-mixings: cross-induced 2-nd order nonlinear refraction", *Opt. Letts.* 18: 1223-1225 (Aug. 1, 1993).
- [82] P. L. Shkolnikov, A. E. Kaplan, and A. Lago, "Phase matching for large-scale frequency upconversion in plasma", *Opt. Letts*, 18: 1700-1702 (Oct. 15, 1993).

- [83] A. E. Kaplan and G. A. Swartzlander, "Self-bending of light: comment", *Opt. Lett.* 19: 71 (Jan. 1, 1994).
- [84] A. E. Kaplan and P. L. Shkolnikov, "Super-dressed two-level atom: very high order harmonic generation and multi-resonances", *Phys. Rev. A* 49, 1275-1280 (Feb., 1994).
- [85] E. Hudis, P. L. Shkolnikov, and A. E. Kaplan, "X-ray stimulated electronic Raman scattering in Li and He", *Appl. Phys. Lett.* 64, 818-820 (Febr. 14, 1994).
- [86] A. E. Kaplan, P. L. Shkolnikov, and B. A. Akanaev, "Bright-bright 2π -Solitons in Stimulated Raman Scattering", *Optics Letters* 19, 445-447 (Apr. 1, 1994).
- [87] E. Hudis and A. E. Kaplan, "Ionization-front Soliton in the X-ray Stimulated Raman Scattering" *Optics Letters* 19, 616-618 (May 1, 1994)
- [88] E. Hudis, P. L. Shkolnikov, and A. E. Kaplan, "X-ray stimulated electronic Raman scattering in neutral gases and inhibited ionization", *JOSA B* 11, 1158-1165, (July 1994).
- [89] A. E. Kaplan, "Subfemtosecond Pulses in Mode-locked 2π -Solitons of the Cascade Stimulated Raman Scattering", *Phys. Rev. Lett.* 73: 1243-1246 (29 August 1994).
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