

### Micro-CV, Dr. Alexander E. Kaplan, September 2003

ph (410)516-7018; fax (410)516-5566; e-mail: sasha@striky.ece.jhu.edu; http://psi.ece.jhu.edu/~kaplan

**Current position:** Prof. of Electr. & Comp. Eng., the Johns Hopkins University, Baltimore, MD 21218

**Education:** • M.S., Physics, Moscow Inst. for Physics and Technology, USSR, 1961

- Ph. D., Phys. & Math., USSR Acad. of Sciences, Moscow, & Gorky St. Univ., USSR, 1967

#### **Employment:**

- 1961-1963: a research scientist at a government lab. near Moscow, USSR.
- 1963-1979: a research staff member at the USSR Acad. of Sciences, Moscow, USSR.
- 1979-1982: a res. staff member at MIT Francis Bitter Natl. Magnet Lab., Cambridge, MA
- 1981, Summer: a Visiting Scientist, Max-Planck-Inst. for Quant. Opt., Garching, Germany.
- 1982-1987: Prof. of Electr. Eng., Purdue University, W. Lafayette, IN
- 1987-present, Prof. of Electr. & Comp. Eng., the Johns Hopkins University, Baltimore, MD
- Fall of 1996 on sabbatical leave at the U. of Ulm, Quantum Physics Dept

#### **Research:**

- **Publications:** two books (*Parametric Oscillators and Frequency Dividers*, 1966, in Russian, and *Resonant Nonlinear Interactions of Light with Matter*, 1989, Springer); about 330 research papers, including *112 papers in regular archive journals*.
- **Consulting:** Bell Labs, Holmdel; NJ, Honeywell Labs; other indust. and gov. labs.
- **Current research efforts:** X-ray transition radiation in multi-layer nano-structures; shock-waves in laser-induced Coulomb explosion of nano-clusters; sub-femtosecond to zepto-second EM-pulse generation and physics with them, stimulated Raman scattering in infrared and X-ray domains, high-field effects, laser-based generation of gamma-photons and nuclear physics with lasers, X-ray nonlinear optics, nonlinear and quantum optics of a single electron, bistable and spatial solitons.
- **Pioneering contributions:** prediction of self-bending, the effect of nonlinear interfaces, new effects in optical bistability, single-electron hysteretic and multiphoton resonances, and the physical principles of super-short pulse generation, in particular mode-locked cascade Raman scattering.
- **Citation rate within last 10 years:** ~200+/year.
- **Honors and Distinctions:** Fellow of the Optical Society of America; a recipient of Alexander von Humboldt Research Award for Senior US Scientists in Germany (1996)
- **Funding:** \$4,500,000 (committed funds included) mostly from AFOSR as a sole PI within last 24 years

**Citizenship:** USA citizen (immigrated to the US in 1979).

#### **Selected recent publications:**

- [1] A. E. Kaplan, "Subfemtosecond Pulses in ... the Cascade Stimulated Raman Scattering", Phys. Rev. Lett. **73**, 1243 (1994).
- [2] A. E. Kaplan, C. T. Law, and P. L. Shkolnikov, "X-ray Narrow-line Transition Radiation Source Based on Low-Energy Electron Beams Traversing a Multilayer Nanostructure", Phys. Rev. **E52**, 6795 (1995).
- [3] A. E. Kaplan and P. L. Shkolnikov, "Electromagnetic "Bubbles" ...: unipolar... EM-Solitons", Phys. Rev. Lett. **75**, 2316 (1995)
- [4] P. L. Shkolnikov, A. E. Kaplan, A. Pukhov and J. Meyer-ter-Vehn, "Feasibility of particle production and nuclear reactions in cascade processes by a sub-terawatt femtosecond laser", Appl. Phys. Lett. **71**, 3471 (1997).
- [5] A. E. Kaplan, "Diffraction-induced transformation of near-cycle and sub-cycle pulses", JOSA B, **15**, 951 (1998).
- [6] P. L. Shkolnikov, A. E. Kaplan, and S. F. Straub, "Delta-ionization: stratified symmetrical electron emission and resonantly structured ionization continuum", Phys. Rev. A, **59**, 490 (1999).
- [7] A. E. Kaplan, I. Marzoli, W. E. Lamb Jr., and W. P. Schleich, "Multimode interference: Highly regular pattern formation in quantum wave packet evolution" Phys. Rev. A, **61**, 32101 (2000).
- [8] A. E. Kaplan and P. L. Shkolnikov, "Lasatron: a proposed source of powerful nuclear-time-scale electromagnetic bursts", Phys. Rev. Lett., **88**, 074801, (2002).
- [9] A. E. Kaplan, B. Y. Dubetsky, and P. L. Shkolnikov, "Nano-tsunami: Shock-shells in Coulomb explosion of clusters", to appear in Phys. Rev. Lett. in 2003