V. Alexander STEFAN, D.Sc.

V. Stefan, internationally renowned for his research in various areas of plasma physics and controlled thermonuclear fusion, has performed scientific research in many of the world's leading research centers like P. N. Lebedev Physics Institute of the Russian Academy of Sciences and the Massachusetts Institute of Technology. He is a founding member of The STEFAN UNIVERSITY and is a founder/series editor for four book series. V. Stefan is the inventor of the ultra short wavelength beat-wave driven free electron laser. His current research is focused on laser neurophysics and laser genomic medicine.

Books by
V. Alexander Stefan
(Author, Editor)

DOCTOR FAUSTEF by V. Alexander Stefan

V. Alexander Stefan - Works in Chronological Order

SCIENTIFIC DOSSIER * **

** Incomplete*

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CONTENTS

3.1. ORGANIZER AND CHAIRMAN OF SCIENTIFIC MEETINGS
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3.2. PRINCIPAL SCENTIFIC INVESTIGATOR ON U.S.
GOVERNMENT CONTRACTS AND/OR GRANTS

3.3. SCIENTIFIC REFEREE FOR JOURNALS AND U.S AGENCIES

1. 1. BIOGRAPHIC DATA

1.1. PERSONAL DATA

- Citizenship: USA
- Other Activities than Science: Guitar Playing, Oil and Acrylic Painting, Photography, Writing.
- Recreational Activities: Soccer, Swimming, Rock Climbing

1.2 EDUCATION

B.Sc., Electrical Engineering and Technical Physics, 1973, University of Belgrade, Belgrade.

M. Sc., Plasma Physics, 1976, University of Belgrade, Belgrade, Belgrade.

D. Sc., Physics, 1980, University of Belgrade, Belgrade, jointly with the P.N. Lebedev Physics Institute of the Russian Academy of Sciences, Moscow, Russia.

1.3 PROFESSIONAL EXPERIENCE

- Institute for Nuclear Sciences, "Boris Kidrich," Belgrade, Research Physicist, 1973-1981.
- P.N. Lebedev Physics Institute, Academy of Sciences of the USSR, Moscow, Visiting Research Physicist, 1977-1981.
- Massachusetts Institute of Technology, Plasma Fusion Center, Visiting Scientist, 1981-1982.

- University of California, Los Angeles, Department of Physics, Visiting Scientist, May 1982.
- University of California, San Diego, Department of Physics, Visiting Scholar, June-August 1982; Visiting Assistant Research Physicist, 1982-1984.
- General Atomics, Inc., San Diego, California, Consultant, August 1982.
- JAYCOR, Inc., San Diego, California, Consultant, 1982-1985.
- California Space Institute, University of California, San Diego, Visiting Assistant Research Physicist, 1985.
- Maxwell Labs, S-Cubed Division, San Diego, California Research Physicist, 1986-1989.
- Physical Dynamics, La Jolla, California, Research Physicist, 1988.
- Institute for Nonlinear Science, University of California, San Diego, Research Associate, 1988-1989.
- La Jolla Institute, La Jolla, California, Research Physicist, Consultant, 1988-1989.
- Maxwell Labs, Balboa Division, San Diego, California, Consultant, 1989.
- Krall Associates, Inc., Del Mar, California, Consultant, 1990-1991.
- The STEFAN UNIVERSITY (The Institute for Advanced Physics Studies), La Jolla, California, Founding President, 1989-Present.

1.4 TEACHING EXPERIENCE

- V. Stefan taught a course in Classical Electrodynamics and Advanced Plasma Physics, and gave numerous tutorial lectures on advanced plasma physics and laser-matter interaction at the Institute for Nuclear Sciences in Vinca, Belgrade, University of Belgrade, and University of Montenegro.
- He has given a series of tutorial lectures on advanced parametric plasma theory at many U.S.research centers: Plasma Fusion Center, Massachusetts Institute of Technology; Department of Physics of the University of California, Los Angeles; Department of Physics of the University of California, San Diego; Berkeley National Laboratory, University of California; and Princeton Plasma Physics Laboratory, Princeton University.
- Numerous tutorial/research talks were given in Russia: P.N. Lebedev Physics Institute, Moscow; Kurchatov Institute for Atomic Energy, Moscow; Ioffe Institute, St. Petersburg, former Leningrad; University of Georgia at Tblisi, Georgia, Former Soviet Union, and at the Institute of Nuclear Physics, Novosibirsk, Russia.

1.5 EDITORIAL EXPERIENCE

- **LIBRARY of CONGRESS ONLINE CATALOG**
  Stefan University Press Series
  Start Over the Session;
  In Search Type Check *Series/Uniform Title Browse*
  In Search Text, Type: *Stefan University Press Series*

1.6 ADMINISTRATIVE EXPERIENCE

- **V. Stefan is a founding member of THE STEFAN UNIVERSITY (The Institute for Advanced Physics Studies) in 1989 - a California non-profit corporation. Within the Institute for Advanced Physics Studies, he founded FRONTIER SCIENCE RESEARCH CONFERENCES - F S R C, which organizes summer and winter schools, topical conferences, workshops, and various advanced courses. He is currently the founding president of The STEFAN UNIVERSITY (The Institute for Advanced Physics Studies).**

1.7 ENTREPRENEURIAL EXPERIENCE

A number of activities were initiated by V. Stefan - a scientific poster production project was established. The scientific posters are a new idea on the market; they serve as educational-visual material reaching various levels of potential buyers: high schools, universities, gift shops, etc. Several new series of books in physics have also been initiated by V. Stefan. The series involve relatively short length books written by the most prominent scientists in a particular area of physics, with emphasis on self-explanatory and comprehensive structure, so that can be used by advanced students and specialists. A production of video material depicting the lives of prominent scientists, historical epochs in the development of science, and important contemporary scientific events were also conceived by V. Stefan.
Stefan University Foundation, Inc., promotes the physics in life sciences (brain research, DNA, origin of life, etc.).

1.8 HONORS AND MEMBERSHIPS

- **IREX Award for Research in the U.S.A.**
- **Member of the American Physical Society.**
- **Member of American Association for Advancement in Science.**
- **Biographee for Who's Who in California,Who's Who in America,Who's Who in the World, Who's Who in Education, Who's Who in Science and Engineering.**

2. RESEARCH

2.1 RESEARCH AREAS

- In his continuing professional career, Dr. V. Stefan has been contributing to a wide range of topics in basic plasma physics, thermonuclear fusion physics, plasma particle acceleration, free electron lasers, X-Ray generation, pulsed power systems, space plasma physics, tethered satellite physics, Marangoni ocean waves, laser-diamond interaction, and seismo-acoustics.
- He worked on plasma heating in tokamaks, mirrors and bumpy torii; generation of suprathermal particles, harmonics and magnetic fields in laser plasma interactions and anomalous processes in heavy ion beam and relativistic electron beam interaction with plasma. He has contributed to the development of parametric theory in field of modulated driver pumps and to the theory of nonlinear interaction of radio waves with the ionospheric plasma. He has worked in the development of saturation processes of parametric instabilities in the framework of weak and strong plasma turbulence theories.
- V. Stefan has contributed to the theory of collective acceleration of particles, free electron lasers (FEL) and current drive in tokamaks. He worked on theory of electrodynamic and mechanical aspects of tethered satellite systems.
- He has contributed to the theory of opening switches, plasma pinches, plasma transport theory and dusty plasma theory. He also worked on the theory of ocean waves in the presence of surface active materials (Marangoni waves). His interest also involves philosophy of science.

2.1.1. BASIC PLASMA PHYSICS

- Activities in basic plasma physics include parametric coupling theory of plasma modes in current carrying plasmas, plasma - relativistic electron beam (REB), magnetized and inhomogeneous plasma systems. A strong attention has been dedicated to this problem in the last twenty years. A new type of two-plasmon instability was discovered in current-carrying plasma.

- He was involved in the development of nonlinear coupling of non-monochromatic electromagnetic waves with plasma. A general theory was presented by him in 1983, with a variety of application possibilities: controlled fusion, particle accelerators, free electron lasers and ionospheric modification.

- V. Stefan was involved in the development of general EIKONAL theory of nonlinear electromagnetic wave-plasma interaction culmination with a paper published in 1987. This is the most general theory presently available. It has been used successfully in laser plasma interaction and radio frequency heating of magnetically confined plasmas

(Tokamaks, Bumpy Tori and Mirrors).

- He has been dedicating a significant research effort to the investigation of interaction of laser radiation with strongly inhomogeneous plasma. A new wave has been discovered - leaking surface waves and the possibility of 100% absorption of laser radiation by these waves.

- The majority of his research in basic plasma phenomena has been dedicated to plasma parametric turbulence problem. It involves the development of weak and strong parametric turbulence theory for magnetized plasma. A general theory using cascading plasma wave collapse as saturation mechanism was published in 1985. Since, then, this theory is successfully applied to many plasma environments: inertially confined plasma, magnetically confined plasma, and ionospheric modification.

- He is involved in research of radiation-induced-acceleration in plasma systems and in basic plasma phenomena involving Alfvén waves (Alfvén Plasma Maser).

- V. Stefan is involved in research on self-consistent approach to ion-acoustic turbulence in plasmas. This approach is based on quasilinear scattering of electrons of ion-acoustic turbulence and nonlinear scattering of ion-acoustic modes off ions.

2.1.2. CONTROLLED THERMONUCLEAR FUSION RESEARCH

2.1.2.A. TOKAMAK THERMONUCLEAR FUSION

- In Tokamak Physics, his research was focused on parametric coupling and absorption in the electron-cyclotron, lower hybrid, frequency ranges. He is involved in research on current drive in parametrically turbulent plasmas and in Tokamak plasma stability. A significant research effort has been done by him in stabilization of trapped particle modes in tokamak environment by radio-frequency waves

- Cross field diffusion and heating caused by trapped particle instabilities (TPI) in the presence of coherent arbitrarily polarized electromagnetic waves in the ion cyclotron range of frequencies has been studied. It was shown that the energy loss rates due to the TPI can be significantly reduced due to the resonant coupling to ion cyclotron harmonic sidebands. Also calculation of the transport and heating due to the ion cyclotron waves themselves was performed. Using the condition that they are of sufficient amplitude to stabilize the TPI, and sing cascade theory the saturated level of the ion cyclotron turbulence is estimated.

- A novel technique of efficient current drive in Tokamaks by CO_2 asymmetric irradiation of D-T pellets in vacuum has been proposed. Using CO_2 lasers of energy > 1kJ and with pulse length less than nanosecond, it is possible to produce simultaneously background plasma and current in Tokamaks. The current consists of suprathermal electrons produced as a consequence of resonant laser pellet interaction. Particularly in

CO_2 laser-pellet interaction 90% of absorbed energy is transferred to fast electrons with energy around 100keV and density < 10^{19} cm^{-3}. We study conditions in interaction physics and pellet design under which this scheme has higher current drive efficiency compared to other schemes.

2.1.2.B. LASER DRIVEN THERMONUCLEAR FUSION

- In this area he is involved in research on suprathermal particles, generation of d.c. magnetic fields and laser radiation harmonics. He also worked on Rayleigh-Taylor and Kelvin-Helmholts instabilities in laser-pellet interaction.

- Generation of suprathermal particles, laser radiation harmonics and quasi-stationary magnetic fields, have been playing a crucial role in diagnostics of laser-laser produced plasma interaction relevant for laser fusion. They are intrinsically a consequence of absorption processes in laser-plasma coupling and have been used as a major tool in new experimental techniques for studies of microscale laser-laser fusion plasma interaction in experiments using neodymium glass and carbon dioxide lasers. There are, however, negative aspects of generation processes regarding laser driven fusion: suprathermal electrons and X-rays produced by them preheat the core of thermonuclear spherical target-pellet; accelerated ions deteriorate implosion symmetry; the quasi-stationary magnetic fields inhibit thermal energy flux toward the pellet core necessary to provide fusion temperatures in the case of non-igniting pellets and/or mass ablation of the pellet's shell in the case of igniting pellets. Consequently, generation processes enhance the demand for the laser driver energy and severely threaten the overall success of the ablation-laser-fusion program.

2.1.2.C. PARTICLE BEAM DRIVEN THERMONUCLEAR FUSION

- Here, his research is oriented to anomalous effects in heavy-ion-beam interaction with fusion pellets. Also research has been done in combined usage of laser and relativistic electron beam in interaction with fusion pellets.

- Based on simple physical models the problem of collective plasma modes excitation in heavy-ion beam fusion have been studied. Heavy-ion beam produced plasma is assumed to be highly ionized when a dominant role in stopping power calculation is played by free electrons. Excitation of Langmuir waves (LW) through "descrete" interaction (long-distance collisions) was studied. In calculation of stopping power a full dielectric permittivity of hot plasma is utilized to include collisional and noncollisional linear dissipation of LW. Neglecting in rate equations hydrodynamic motion during heavy-ion beam pulse and thermal conductivity of target plasma, electric field energy level of LW was estimated. Based on this estimation analyses have been done regarding the possibility of appearance of anomalous effects in heavy-ion beam produced plasma similar to those met in other inertial confinement fusion schemes.

- Along with heavy ion-beam energy coupling to a pellet, propagation stability of

the beam through the chamber plays a crucial role in heavy ion beam fusion. Utilizing Monte Carlo simulation propagation characteristics of a relativistic heavy ion beam through a background gas with pressures in the range of 1-30 Torr. have been studied. Influence of generation of secondary electrons on heavy ion beam propagation was considered. The emphasis was put on focusing by self-induced magnetic fields.

2.1.2.D. MAGNETIC MIRROR THERMONUCLEAR FUSION

- In this fusion plasma environment his research was directed to stabilization of interchange modes by radio-frequency waves in ion-cyclotron frequency regime. A theory was developed (1985) which explained the results of Phaedrus Mirror at the University of Wisconsin.

- It has been shown that spatially uniform electric fields at frequency ω_0 in the ICRF can stabilize electrostatic interchange modes by driving sidebands at $\omega \pm \omega_0$ which couple nonlinearly to the low frequency quasimodes at ω. By relaxing driver fields in dipole approximation and using weak turbulence techniques the nonlinear interaction of ICRF fields of arbitrary wave vector $k_{\sim 0}$ with interchange modes has been studied. Results were obtained which depend on the polarization of the ICRF, e.g., for $k_{\sim 0}$, $E_{\sim 0} \perp B_{\sim 0}$ ($|E_{\sim 0}|$ is the ICRF field amplitude and $B_{\sim 0}$ the ambient magnetic field). The dependence on k_0 is weak for $kL_n > 1$ (k is the interchange wave number and L_n is the density gradient length), and full stabilization remains possible in a variety of situations. A new interaction due to finite k_0 becomes possible for $k_{\sim 0}$, $E_{\sim 0}$ _ $B_{\sim 0}$, which is shown to have a strong effect on low frequency stability.

- A weak coupling, mode-mode dispersion relation was used to study scattering of magnetosonic waves off interchange modes. The scattered waves were rf sideband waves which correspond to magnetosonic modes. It was demonstrated that his process can stabilize interchange modes if certain conditions are satisfied. For fast wave scattering, the interaction is stabilizing if $k < 2k_0 \cos|\theta|$, where θ is the angle between the rf wave vector $k_{\sim 0}$ and the interchange wave vector $k_{\sim}$. When $\theta = 0$ or π, for example, near-resonant ($k \approx 2k_0$) backscattering stabilizes interchanges for small incident fast wave electric field strength, given in standard notation) by

  $$E_0 > 2 (2L_n (1 + T_e/T_i)/R_c)^{1/2} \quad (1 - k^2/4k^2_0)^{1/2} \quad B_0 v_i/c.$$

- These predictions were compared with those of previous calculations based on other mechanisms for rf stabilization of interchange modes.

2.1.2. E. BUMPY TORUS THERMONUCLEAR FUSION

- Parametric coupling of EM waves with Bumpy Torus plasma was investigated in electron-cyclotron, lower-hybrid and in cyclotron frequencies. Parametric generation mechanism of electron and ion rings were also studied by V. Stefan and collaborators. Anomalous absorption processes are investigated for this fusion scheme and results

published in Phys.Fluids (1985): (Stefan, V., Krall, N.A., "Nonlinear Mode Conversion and Anomalous Absorption Processes During Radio Frequency Heating of Bumpy Torus Plasmas", Phys. Fluids. 28 (1985) 2937-2959 (23 pages)

- In the Elmo Bumpy Torus - EBT thermonuclear fusion scheme, waves in the electron cyclotron frequency range (E C F R) play a crucial role. They are used in a steady-state plasma creation, in plasma sustainment, and in core plasma heating. In addition, wave absorption in the second electron-cyclotron harmonic resonance layer plays a dominant role in the production of the hot electron annulus required for stability.

- Motivation for the study was to evaluate the significance of parametric processes in electromagnetic wave-EBT plasma interactions and more specifically in wave heating of EBT plasma. The calculations done were also used in investigating the possibility of "nonlinear control" in EBT, e.g., new ways of production of *e* - and *i* - rings, their location, modification of startup conditions, etc.

2.1.3. PLASMAPARTICLE ACCELERATORS

- A novel technique for creation of an ultra-high gradient (GeV/m) particle accelerator is studied. It is based on stimulated Raman scattering of a beat laser driver (ω_{01}, k_{01}), (ω_{02}, k_{02}) on Doppler-shifted Langmuir waves (LW) in parallel interaction with relativistic electron beam. The saturated electric field amplitude of the parametrically driven accelerating LW is given by $E^2_{LW}/8\pi = f(I_0, I_1, \Omega)$ where I_α ($\alpha = 0, 1$) are laser irradiancies, $\Omega = \omega_{01} - \omega_{02}$ beat frequency chosen to be $\Omega \geq 2\omega_B$ (ω_B is the beam plasma frequency), and *f* function denoting regimes of parametric coupling. Due to the different scaling laws valid for parametric interaction compared to nonlinear mixing the energy gain per electron (ΔW) and laser-LW coupling efficiency (η) can be significantly higher than in conventional plasma beat-wave accelerators ($\Delta W \sim 1 GeV$, $\eta \sim 10\%$).

2.1.4. FREE ELECTRON LASERS

- A novel technique for creation of a free electron laser (FEL) is proposed by V. Stefan. It is based on stimulated Raman backscattering (SRS) of a beat laser driver (ω_{01}, k_{01}), (ω_{02}, k_{02}) on Doppler shifted electron Bernstein (EB) modes excited on a relativistic electron beam. The frequency of EB modes $\omega_{EB}(n)$ is $n\Omega_e$ ($n = 1, 2, ...$, where ω_e is the beam electron cyclotron frequency), and beat frequency $\omega_{01} - \omega_{02} = (n + \alpha)\ \Omega_e$ ($0 \leq \alpha \leq 1$) so that the FEL wavelength is given by $\lambda_{FEL} = (c/V_{EB}^{(1)}) \times \lambda_{EB}^{(1)} / 4\gamma^2_{REB}\ (n + \alpha)$ ($V_{EB}^{(1)}$ - phase velocity of principal EB mode and c free space speed of light). For $n = 10$ and $\gamma_{REB} = 10$, FEL wavelengths, $\gamma_{FEL} = 0.8 - 1.6\mu m$, can be easily obtained if guiding longitudinal magnetic field B_0 is of the order of a few kG. Threshold (dissipative and mismatching) for the lasing process is proportional to $(2^n(n - 1)!)^{1/4}$. The efficiency of the proposed FEL can be significantly higher than that of the FEL with a wiggler field.

2.1.5. X-RAY GENERATION

- An interaction of CO_2 laser beam with preformed Z-pinch plasma is proposed by V. Stefan as a source of a hard X-ray radiation. Linear and nonlinear absorption processes of laser radiation by Z-pinch plasma are studied. Runaway electrons of approximately hundred of keV's can be initially produced. They can be further accelerated up to 1 MeV energies in a resistive electric field of Z-pinch plasma. The Runaway electron current and X-Ray radiation yield are studied for various parameters.

2.1.6. PULSED POWER SYSTEMS

- The development of various types of micro instabilities that can take place in the environment of Z-pinch type switches have been investigated. Special attention of V. Stefan is dedicated to gradient instabilities (temperature and density) taking into account the strong collisionality which is present in these plasmas. He also studied production of runaway electrons due to the Dreicer field and plasma turbulence, and corresponding beam instabilities. The influence of the above mentioned instabilities on plasma resistivity and their effects on Z-pinch plasmas are thoroughly investigated by V. Stefan and collaborators.

2.1.7. IONOSPHERIC, SPACE, AND ASTROPHYSICAL PLASMA PHENOMENA

- His research work in this area involved the double parametric resonance theory for ionospheric modification experiments. A study has been done regarding excitation of oblique Langmuir wave, electron Bernstein and ion-Bernstein modes in ionospheric environment.

- Interest in space plasma physics includes plasma magnetospheric masers (or Alfvén maser). A research is concentrated on effective absorption saturation and passive mode synchronization.

- V. Stefan is involved in research on hot interstellar gas (galactic wind). The research is based on strong coupling of cosmic rays with self generated Alfen turbulence.

2.1.8. TETHERED SATELLITE SYSTEMS

- There has been renewed interest in the mechanical and electrical effects of coupling two space craft together by long tethers. The equivalent potential produced by the Lorentz force can be many kilovolts, and if connection can be made to the ambient plasma, substantial electrical effects could be produced. However, even at densities of 10^{-7} amps per square centimeter, current withdrawal has profound effects on the surroundings; major local disturbances are produced, and long signals propagate to distant parts of the magnetosphere. The theory of both the local and distant phenomena has been developed by V. Stefan and collaborators.

2.1.9. MARANGONI OCEAN WAVES - (SURFACTANT PHENOMENA)

· The formalisms for the treatment of physico-chemical kinetics of surface active substances (surfactants) at the liquid-gas interface has been studied by V. Stefan. Three formalisms for surfactant kinetics are studied; pure diffusion and pure Langmuir chemical kinetics (LCK) formalisms, and diffusion in interplay with Langmuir chemical kinetics. The problems regarding the general solutions (analytical and numerical) within the formalisms are stated. Based on two-phase physical model of diffusion-adsorption (desorption) processes, mathematical formalism of the adsorption kinematics is significantly simplified in the work of V. Stefan. Surface adsorption and subsurface volume concentration are analytically studied at early and late (saturation) phase of adsorption process. The saturation time is analytically evaluated as a function of diffusion and surface-potential barrier (SPB) crossing characteristics of surface active materials.

2.1.10.LASER-DIAMOND INTERACTION FOR JEWELRY INDUSTRY

· His recent research has been focused on application of laser diamond research science to jewelry industry. The major goal is to use this interaction to grade the diamonds: clarity, color, cut with emphasize on design of new measurement instruments.

2.1.11. NONLINEAR ACOUSTICS - SEISMOACOUSTICS

· The model of a granular medium with fluid pore filling is used to study the variations of linear and nonlinear elastic parameters as a function of initial stress and material structure. The research is focused on geological conditions interesting for seismoprospecting.

2.2 PUBLICATIONS (Incomplete)

2.2.1. BOOKS

2.2.1.A. AUTHOR

1. V. Stefan: Theory of Nonlinear Electromagnetic Wave-Plasma Interaction, (S-U-Press, 1996.)

2. V. Stefan: Einstein's Wisdom (S-U-Press, 2000.)

2.2.1.B. EDITOR /AUTHOR

1. V. Stefan (Editor): Research Trends in Physics: Nonlinear and Relativistic Effects in Plasmas, (American Institute of Physics, New York, 1992) 750 pages.

2. V. Stefan (Author/Editor): PHYSICS and SOCIETY. Essays in Honor of V. F. Weisskopf (American Institute of Physics, New York,1988)

MONOGRAPHS in SCIENCE and TECHNOLOGY

- V. Stefan (Editor)
  Nonlinear and Relativistic Effects in Plasmas (Research Trends in Physics)
  American Institute of Physics Press; (June 1, 1992)
- V. Stefan (Editor)
  Environmental Physics, Vol. 1 : Climate, Greenhouse Gases, Ozone Layer, Aerosols (Stefan University Press Series on Frontiers in Interdisciplinary Physics,1996)
- V. Stefan (Editor)
  Environmental Physics, Vol. 2 : Industrial Ecology, Pollution, Hazardous Waste, Environmental Biophysics, Environmental Optics (Stefan University Press Series on FRONTIERS in INTERDISCIPLINARY PHYSICS, 1996)
- V. Stefan (Editor)
  Environmental Physics, Vol 3 : Soil Physics, Water, Soil-Atmosphere-Hydrosphere Interaction, Earthquake Physics (Stefan University Press Series on FRONTIERS in INTERDISCIPLINARY PHYSICS, 1996)
- V. Stefan (Editor)
  Environmental Physics, Vol. 4: Environmental Plasma Physics (Stefan University Press Series on FRONTIERS in INTERDISCIPLINARY PHYSICS, 1996)
- V. Stefan (Editor)
  Plasma Astrophysics, Vol 1: Dynamos, Magnetic Field Interactions, Astrophysical Objects (Stefan University Press Series on RESEARCH TRENDS in PHYSICS, 1996)
- V. Stefan (Editor)
  Plasma Astrophysics, Vol 2: Solar and Stellar Physics, Particle Acceleration and Propagation (Stefan University press Series on RESEARCH TRENDS in PHYSICS, 1996)
- V. Stefan (Editor)
  Physics of the Origin of Life (Stefan University Press Series on FRONTIERS in INTERDISCIPLINARY PHYSICS,1996)
- V. Stefan (Author, Editor)
  Physics and Society: Essays in Honor of Victor Frederick Weisskopf by the International Community of Physicists (American Institute of Physics;
  March 1, 1998)
- V. Stefan (Editor)
  Physics of Laser-Plasma Interaction (Stefan University Press Series on RESEARCH TRENDS in PHYSICS,1997)
- V. Stefan (Editor)
  Aerosols (Stefan University Press Series on FRONTIERS in SCIENCE and TECHNOLOGY, 2000)
- V. Stefan (Editor)
  Ferroelectrics Vol. 1 (Stefan University Press Series on FRONTIERS IN SCIENCE and TECHNOLOGY,2001)
- V. Stefan (Editor)

Ferroelectrics Vol. 2 (Stefan University Press Series on FRONTIERS IN SCIENCE and TECHNOLOGY,2001)

- **V. Stefan (Editor)**
  Chaos and Transport in Fluids and Plasmas (Stefan University Press Series on RESEARCH TRENDS in PHYSICS,2001)
- **V. Stefan (Editor)**
  Science and Technology of Carbon and Carbide Materials-2002: Frontier Science Research Conferences-F S R C Book of Abstracts. Bulletin of the Stefan University. Vol. 14, Number 12,February 2002.
- **V. Stefan (Editor)**
  Select Topics in Laser-Matter Interaction (The Stefan University Press Series on Frontiers in Interdisciplinary Physics, 2002)
- E. M. Dianov, T. Goto, V. Stefan (Editors)
  Select Topics in Optical Fibers (Stefan University Press Series on Frontiers in Science and Technology, 2003)
- N. Matsuo, K. S. Lim, V. V. Osiko, S. Zaima, V. Stefan (Editors)
  Select Topics in Wide Bandgap Materials, Vol. 1(Stefan University Press Series on Frontiers in Science and Technology, 2004)
- N. Matsuo, K. S. Lim, V. V. Osiko, S. Zaima, V. Stefan (Editors)
  Select Topics in Wide Bandgap Materials, Vol. 2 (Stefan University Press Series on Frontiers in Science and Technology, 2004)
- V. Stefan N. G. Basov (Editors)
  Semiconductor Science and Technology, Volume 1: Semiconductor Lasers (Stefan University Press Series on Frontiers in Science and Technology, 1999)
- V. Stefan N. G. Basov (Editors)
  Semiconductor Science and Technology, Volume 2: Semiconductor Lasers (Stefan University Press Series on Frontiers in Science and Technology, 1999)
- V. Stefan G. Charpak (Editors)
  Medical Physics (Stefan University Press Series on FRONTIERS in INTERDISCIPLINARY PHYSICS, 1996)
- **V. Stefan (Editor)**
  Biophysics and Physics of DNA (Stefan University Press Series on FRONTIERS in INTERDISCIPLINARY PHYSICS, 1996)
- V. Stefan A. M. Prokhorov (Editors)
  Diamond Science and Technology Vol 1: Laser Diamond Interaction.Plasma Diamond Reactors(Stefan University Press Series on FRONTIERS in SCIENCE and TECHNOLOGY, 1999)
- V. Stefan A. M. Prokhorov (Editors)
  Diamond Science and Technology Vol 2: Laser Diamond Interaction.Plasma Diamond Reactors(Stefan University Press Series on FRONTIERS in SCIENCE and TECHNOLOGY, 1999)
- V. Stefan E. V. Zharikov (Editors)
  Crystal and Epitaxial Growth Vol 1 : Epitaxial Growth (Stefan University Press Series on FRONTIERS in SCIENCE and TECHNOLOGY, 2001))
- V. Stefan E. V. Zharikov (Editors)

Crystal and Epitaxial Growth Vol 2 : Epitaxial Growth (Stefan University Press Series on FRONTIERS in SCIENCE and TECHNOLOGY, 2001))

- V. Stefan (Editor)
  Nanophotonics (Stefan University Press series on FRONTIERS in SCIENCE and TECHNOLOGY, 2001)
- V. Stefan (Editor)
  Magnetic Oxides (Stefan University Press Series on FRONTIERS in SCIENCE and TECHNOLOGY, 2000)
- V. Stefan (Editor)
  Biomedicine (Stefan University Press Series on FRONTIERS in BIOMEDICAL SCIENCE and TECHNOLOGY, 2000)
- N. Matsuo, K. S. Lim, V. V. Osiko, S. Zaima, V. Stefan (Editors)
  Select Topics in Wide Bandgap Materials, Vol. 1 (Stefan University Press Series on Frontiers in Science and Technology, 2004))
- N. Matsuo, K. S. Lim, V. V. Osiko, S. Zaima, V. Stefan (Editors)
  Select Topics in Wide Bandgap Materials, Vol. 2 (Stefan University Press Series on Frontiers in Science and Technology, 2004)
- V. Stefan (Editor)
  Science and Technology of Nitride Materials-2001: Frontier Science Research Conferences-FSRC Book of Abstracts. Bulletin of the Stefan University. Vol. 13,No 14,November 2001
- P. Reineker, A. Vitukhnovsky, V. Stefan (Editors)
  Select Topics in Luminescent Materials (Stefan University Press Series on Frontiers in Science and Technology, 2004)
- V. Stefan (Editor)
  Near-Earth-Space Environmental Physics - 1997 : Frontier Science Research Conferences--F S R C BOOK of ABSTRACTS (The Stefan University Press, 1997)
- V. Stefan (Editor)
  Laser Medicine and Laser Biophysics. FSRC Book of Abstracts (The Stefan University Press, 1999)
- V. Stefan (Editor)
  Science and Technology of Magnetic Oxides - 1999 : FSRC Book of Abstracts. (The Stefan University Press, 1999)
- V. Stefan (Editor)
  Science and Technology of Luminescent Materials-2002: Frontier Science Research Conferences-FSRC Book of Abstracts. (The Stefan University Press, 2002)
- V. Stefan (Editor)
  Radiation Oncology Physics - 2001 : FSRC Book of Abstracts. (Stefan University Press, 2001)
- V. Stefan (Editor)
  Semiconductor Science and Technology - 1998 : FSRC Book of Abstracts. (Stefan University Press, 1998)
- V. Stefan (Editor)

Laser Crystals - 1999 : FSRC Book of Abstracts (The Stefan University Press, July 12, 1999)

- V. Stefan (Editor)
  Crystal and Epitaxial Growth - 2001 : Frontier Science Research Conferences --F S R C BOOK of ABSTRACTS (The Stefan University Press, 2001)
- V. Stefan (Editor)
  Diamond Science and Technology - 1998 : Frontier Science Research Conferences--F S R C BOOK Of ABSTRACTS. (The Stefan University Press, 1998)

- **Books by V. Stefan in Niels Bohr Library of the American Institute of Physics.**

POPULAR SCIENCE, TECHNOLOGY, and MEDICINE

- V. Stefan (Author, Editor)
  Physics and Society: Essays in Honor of Victor Frederick Weisskopf by the International Community of Physicists (American Institute of Physics; March 1, 1998)
- V. Stefan
  The Diamond : Its 5 C's (Cost, Carats, Clarity, Color, Cut)
  (The Stefan University Press; (February 11, 1999)

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2.3 PATENTS

1. Beat-Wave Driven Free Electron Laser,

2. Parametric Plasma Beat-Wave Particle Accelerator.

3. X-Ray Generation (CO_2 Laser-Z Pinch Plasma Hybrid)

3. PROFESSIONAL ACTIVITIES OTHER THAN RESEARCH

3.1 ORGANIZER AND CHAIRMAN OF SCIENTIFIC MEETINGS

V. Stefan organized and chaired/co-chaired the following meetings:

- Topical Conference on Research Trends in Nonlinear and Relativistic Effects in Plasmas, February 5-8, 1990, Catamaran Resort Hotel, San Diego, California
- Achievements in Physics, January 28-29, 1991, La Valencia Hotel, La Jolla, California, in Cooperation With the Department of Physics, University of California, San Diego, La Jolla, California
- International Topical Conference on Research Trends in Inertial Confinement Fusion, February 4-6, 1991, La Valencia Hotel, La Jolla, California
- International Topical Conference on Research Trends in Coherent Radiation Generation and Particle Accelerators, February 11-13, 1991, La Valencia Hotel, La Jolla, California
- International Topical Conference on Research Trends in Chaotic Dynamics and Transport in Fluids and Plasmas, February 18-20, 1991, La Valencia Hotel, La Jolla, California

- International Topical Conference on Research Trends in Nonlinear Space Plasma Physics, February 25-27, 1991, La Valencia Hotel, La Jolla, California
- International Topical Conference on New Ideas in Tokamak Confinement, January 27-29, 1992, La Valencia Hotel, La Jolla, California
- International Topical Conference on Research Trends in Plasma Astrophysics, November 8-10, 1993, La Valencia Hotel, La Jolla, California
- International Topical Conference on Research Trends in Nonlinear and Quantum Optics, November 22-24, 1993, La Jolla, California
- International Topical Conference on Research Trends in Environmental Physics, November 29-December 1,1993, La Valencia Hotel, La Jolla, California

3.3 SCIENTIFIC REFEREE FOR JOURNALS AND AGENCIES

* Physics of Fluids

* Journal of Plasma Physics

* Plasma Physics and Controlled Fusion

* Journal of Applied Physics

* NASA

* Nuclear Fusion

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