

William Franklin Krupke
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Education: **Ph.D.**, Physics, Univ. of California at Los Angeles, 1966
MA, Physics, Univ. of California at Los Angeles, 1961
BS, Physics, Rensselaer Polytechnic Institute, 1958

Professional Experience:

2003-present WFK Lasers, LLC, Consultancy, **President**
1987-2003 Applied Lasers, Consultancy, **President**
1981-1999 LLNL, Laser Program, **Deputy Program Leader**
1980-1981 LLNL, Laser Program, **Chief Scientist**

- LLNL, Laser Program, **Deputy Y-Div Leader**
- Hughes Aircraft Co., Laser Division, **Associate Leader**
- Aerospace Corp, Laser Department, **Member Technical Staff**

1961-1961 Honeywell Corp, Laser Applications, **Member Technical Staff**
1958-1961 Hughes Aircraft Co., Microwave Dept., **Member Technical Staff**

Executive Summary:

Bill Krupke began his professional career at the Hughes Aircraft Company on a Masters Degree work-study fellowship. During this time, Bill performed technical development of non-linear ferromagnetic microwave devices for use in radar systems. Following award of the Masters of Arts degree in 1961, Bill worked briefly at the fledging Laser Applications Department on Honeywell Corp in Los Angeles where he participated in the development of one of the first ruby laser range finder systems. Later in 1961, Bill joined the newly formed Laser Department at the Aerospace Corporation in Los Angeles where he performed spectroscopic research on rare earth and transition metal doped luminescent materials suitable for use in solid state lasers. He also demonstrated one of the first erbium doped crystalline lasers emitting in the near infrared. Bill continued his graduate studies at UCLA earning the PhD degree in Physics by performing original research on the electronic structure of trivalent neptunium ions in a dielectric crystalline matrix, and on the application of a semi-empirical model of crystal-field-induced electric dipole transition intensities in crystals doped with trivalent rare ions.

In 1966, Bill returned to the Hughes Aircraft Company, Laser Division where he performed research on various types of lasers, including infrared solid state lasers, infrared chemical lasers, nonlinear optical parametric oscillators, and CO₂ discharge and gas dynamic lasers. In particular, Bill was the first to systematically apply Judd-Ofelt optical transition probability theory to the identification of novel rare earth doped solid state

laser materials.

In 1972, Bill co-founded the Laser Directorate at the Lawrence Livermore National Laboratory (LLNL), the organization responsible for the development and execution of the Laboratory's Inertial Confinement Fusion (ICF) and Atomic Vapor Laser Isotope Separation (AVLIS) national R&D programs. During his 27 years there, Bill variously served as Program Leader, Chief Scientist, and finally Deputy Associate Director for 20 years. At LLNL, Dr. Krupke led and participated in the design, development, and construction of evermore powerful Nd:glass lasers for fusion research (Janus, Argus, Shiva, Novette, and NOVA systems). He also engaged in the development of concepts and technologies for repetitively pulsed high-peak-power lasers suitable for driving future inertial fusion energy reactors, including KrF excimer and diode pumped solid state lasers. He also participated in the development of XeCl excimer, copper-vapor, and dye lasers for use in industrial scale uranium enrichment.

Since 1985 at LLNL, he was actively engaged in the development of diode-pumped high-average-power solid state lasers, and their uses in military, industrial, and commercial applications.

Bill has performed and published research on many types of gas and solid state lasers; he is internationally known for his work in developing and applying semi-empirical models and spectroscopic data bases to the invention and development of novel families of solid state lasers (various rare earth doped laser glasses, tunable chromium-doped colquirite crystals, tunable transition-metal doped chalcogenide crystals, and various Yb doped apatite crystals).

In 1987, Bill formed Applied Lasers (WFK Lasers, LLC since 2003), to provide technical consulting services to both private, venture-backed, and public companies engaged in commercial and industrial laser and photonic technologies. In May 1999, Krupke left LLNL to devote full time to this consulting endeavor, and to develop novel disruptive laser solutions with which to address emerging commercial and industrial laser applications. For 14 years, Bill served as a Director of the public company IPG Photonics, leading manufacturer of high power fiber lasers for commercial and industrial applications. He also is a retained consultant for several private high technology companies with photonics-centric products and applications, among them Crystal Photonics, and Foro Energy. At WFK Lasers, Krupke invented and patented a new class of lasers designated "diode-pumped alkali lasers, or DPALs, and more recently a novel diode-pumped molecular gas laser. The DPAL is presently undergoing significant development under DOD funding, and has achieved kilowatt output power levels.

Dr. Krupke is a Fellow of the Optical Society of America and is a Senior Member of the IEEE. He has served as an elected member of the Board of Directors of the Optical Society of America, and as chairperson of the Quantum Electronics, and the Photonics groups of the OSA Technical Council. He served as CLEO program and general co-chairs, and served for several years in various governance capacities for OSA's Topical

Advanced Solid State Lasers meeting. He has authored or co-authored over 70 scientific publications in the field of quantum electronics, has published several book chapters, has presented tens of invited talks (including several tutorial, keynote and plenary presentations at international laser conferences), and has authored or co-authored 25 patents. Journal publication, patent, and presentation lists are available upon request. He has served on the editorial boards of several prestigious international technical journals, including the Journal of Applied Physics, the Soviet Journal of Quantum Electronics, and the European Journal of Optics and Quantum Electronics.

Bill lives in Pleasanton, CA with Susan, his wife of 54 years; they have two adult children, and three grandchildren.

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