

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASML NETHERLANDS B.V., EXCELITAS TECHNOLOGIES CORP., AND QIOPTIQ
PHOTONICS GMBH & Co. KG,
Petitioners

v.

ENERGETIQ TECHNOLOGY, INC.,
Patent Owner.

Case IPR2016-00555

**DECLARATION OF J. GARY EDEN, PH.D.
REGARDING U.S. PATENT NO. 8,309,943
CLAIMS 14, 15, 17, AND 18**

ASML 1306

TABLE OF CONTENTS

	<u>Page</u>
I. BACKGROUND	1
II. LEGAL PRINCIPLES.....	7
III. PERSON OF ORDINARY SKILL IN THE ART	8
IV. OVERVIEW OF THE '943 PATENT	9
A. Summary of the Prosecution History	10
V. CLAIM CONSTRUCTION	11
A. "Light"	12
B. "Blocker"	14
VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	15
A. Laser Sustained Plasma Light Sources With Blockers Were Known Long Before the Priority Date of the '943 Patent	15
VII. GROUNDS FOR FINDING THE CHALLENGED CLAIMS INVALID... 19	
A. Ground 1: Claims 14, 15, 17, and 18 are obvious over Gärtner	19
B. Ground 2: Claims 14, 15, 17, and 18 are obvious over Gärtner in view of Hiura.....	30
C. Ground 3: Claims 14, 15, 17, and 18 are obvious over Gärtner in view of Ikeuchi.....	41
VIII. RESPONSE TO ARGUMENTS RAISED BY PATENT OWNER IN ITS PRELIMINARY INJUNCTION MOTION	50
A. Patent Owner's Arguments Regarding Objective Indicia of Non-Obviousness	50
IX. AVAILABILITY FOR CROSS-EXAMINATION	51
X. RIGHT TO SUPPLEMENT	52
XI. JURAT	52

I, J. Gary Eden, Ph.D., declare as follows:

1. My name is J. Gary Eden.

I. BACKGROUND

2. I am the Gilmore Family Professor of Electrical and Computer Engineering and Director of the Laboratory for Optical Physics and Engineering at the University of Illinois in Urbana, Illinois.

3. I received a B.S. in Electrical Engineering (High Honors) from the University of Maryland, College Park in 1972 and an M.S. and Ph.D. in Electrical Engineering from the University of Illinois in 1973 and 1976, respectively.

4. After receiving my doctorate, I served as a National Research Council Postdoctoral Research Associate at the United States Naval Research Laboratory (“NRL”), Optical Sciences Division, in Washington, DC from 1975 to 1976. As a research physicist in the Laser Physics Branch (Optical Sciences Division) from 1976 to 1979, I made several contributions to the visible and ultraviolet lasers and laser spectroscopy field, including the co-discovery of the KrCl rare gas-halide excimer laser and the proton beam pumped laser (Ar-N₂, XeF). In 1979, I received a Research Publication Award for this work at the NRL.

5. In 1979, I was appointed assistant professor in the Department of Electrical and Computer Engineering at the University of Illinois. In 1981, I became associate professor in this same department, and in 1983, I became

professor in this department. In 1985, I was named the Director of the Laboratory for Optical Physics and Engineering, and in 2007, I was named the Gilmore Family Professor of Electrical and Computer Engineering. I continue to hold both positions today. In addition, I am also Research Professor in the Coordinated Science Laboratory and the Micro and Nanotechnology Laboratory, and I hold academic appointments at the University of Illinois in the Departments of Materials Science and Engineering, Bioengineering, and Nuclear, Plasma, and Radiological Engineering.

6. Since joining the faculty of the University of Illinois in 1979, I have been engaged in research in atomic, molecular and ultrafast laser spectroscopy, the discovery and development of visible and ultraviolet lasers, and the science and technology of microcavity plasma devices. My research has been featured in Laser Focus, Photonics Spectra, Electronics Weekly (UK), the Bulletin of the Materials Research Society, Microwaves, Optical Spectra, Electro-Optical Systems Design, Optics and Laser Technology, Electronics, Optics News, Lasers and Optronics, IEEE Potentials, IEEE Spectrum, and IEEE Circuits and Devices. My work was also highlighted in the National Academy of Sciences report Plasma 2010, published in 2007.

7. I have made several major contributions to the field of laser physics, plasma physics, and atomic and molecular physics. I co-invented a new form of

lighting, “light tiles”, that are thin and flat. This culminated in the formation of a company known as Eden Park Illumination. I discovered numerous ultraviolet, visible and near-infrared atomic and molecular lasers, including the KrCl ultraviolet (excimer) laser, the optically-pumped XeF, HgCl, and rare gas lasers and the CdI, CdBr, ZnI, Li, Fe, and Cd visible and near-infrared lasers. I demonstrated the first long pulse ($> 1 \mu\text{s}$) excimer laser and the first lasers (Ar – N₂, XeF) pumped by a proton beam. The excimer lasers are now used worldwide in photolithography, surgical procedures (such as corneal refractive correction) and micromachining of materials. I discovered the laser excitation spectroscopy of photoassociation (the absorption of optical radiation by free atomic pairs) of thermal atoms as a probe of the structure of transient molecules. I demonstrated with my graduate students the first ultraviolet and violet glass fiber lasers. I discovered the excimer-pumped atomic lasers (lasing on the D1 and D2 lines of Na, Cs, and Rb) for laser guide stars and mesosphere probing by LIDAR. I conducted the first observation (by laser spectroscopy) of Rydberg series for the rare gas diatomics (Ne₂, Ar₂, Kr₂, Xe₂) and the first measurement of the rotational constants for Ne₂ and Ar₂, as well as the vibrational constants for Ne₂⁺. I pioneered the development of microcavity plasma devices and arrays in silicon, Al/Al₂O₃, glass, ceramics, and multilayer metal/polymer structures. For this, I was the recipient of the C.E.K. Mees Award from the Optical Society of America, the

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.