LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel) : Comparison of excitation mechanisms and the corresponding emission spectra in femto second and nano second laserinduced breakdown spectroscopy in reduced ambient air and their performances in surface analysis

Nama/ Jumlah Penulis : 17 Orang

Status Pengusul : ~~Penulis pertama~~/ Penulis ke 14 / ~~Penulis Korespondesi~~ **

Identitas Jurnal Ilmiah :
a. Nama Jurnal : Journal of Laser Applications
b. Nomor ISSN : 1042346X
c. Vol, No., Bln Thn : Vol. 32, No. 1, Februari 2020
d. Penerbit : Laser Institute of America
e. DOI artikel (jika ada) : 10.2351/1.5119182
f. Alamat web jurnal : https://lia.scitation.org/journal/jla
Alamat Artikel : https://lia.scitation.org/doi/pdf/10.2351/1.5119182
g. Terindex : Scopus

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[ ] Jurnal Ilmiah Nasional Terakreditasi
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Total = (100%)	**40**			**37,8**
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Semarang, 20 April 2021
Reviewer 1

Prof. Dr. Suryono, S.Si., M.Si.
NIP. 197306301998021001
Unit Kerja : Fisika
Bidang Ilmu: Fakultas Sains dan Matematika

LEMBAR
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a. Kelengkapan unsur isi jurnal (10%)	4			3.7
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d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,5
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2. **Ruang lingkup dan kedalaman pembahasan:**
   Paper ini membahas tentang karakteristik statis dan dinamis dari plasma dan kualitas spektral emisi yang dihasilkan yang dihasilkan oleh iradiasi laser femtosecond (fs) dan laser nanodetik (ns).
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
   Data-data/informasi serta metodologi yang digunakan sangat mutakhir.
4. **Kelengkapan unsur dan kualitas terbitan:**
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Semarang, 03 Juli 2021
Reviewer 2

Dr. Eng. Eko Hidayanto, S.Si., M.Si.
NIP. 197301031998021001
Unit Kerja : Fisika
Bidang Ilmu: Fakultas Sains dan Matematika

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Karya Ilmiah (Artikel)	:	Comparison of excitation mechanisms and the corresponding emission spectra in femto second and nano second laserinduced breakdown spectroscopy in reduced ambient air and their performances in surface analysis
Jumlah Penulis	:	17 Orang
Status Pengusul	:	~~Penulis pertama~~/ Penulis ke 14/ ~~Penulis Korespondesi~~ **
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		g. Terindeks di Scimagojr/Scopus ~~atau di….~~**
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	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi jurnal (10%)	3,8	3.7	3,75
b. Ruang lingkup dan kedalaman pembahasan (30%)	11,2	11,7	11,45
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	11,4	11,5	11,45
d. Kelengkapan unsur dan kualitas penerbit (30%)	11,4	11,5	11,45
Total = (100%)			38,1
Nilai untuk Pengusul : 20% x (38,1/16) = 0,476			

Semarang, 24 Februari 2021

Reviewer 1	Reviewer 2
Prof. Dr. Suryono, S.Si., M.Si.	Dr. Eng. Eko Hidayanto, S.Si., M.Si.
NIP. 197306301998021001	NIP. 197301031998021001
Bidang ilmu/Unit kerja : Fakultas Sains dan Matematika/Fisika	Bidang ilmu/Unit kerja : Fakultas Sains dan Matematika/Fisika

Document type
Article

Source type
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ISSN
1042346X

DOI
10.2351/1.5119182

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Journal of Laser Applications • Volume 32, Issue 1 • 1 February 2020 • Article number 012014

Comparison of excitation mechanisms and the corresponding emission spectra in femto second and nano second laser-induced breakdown spectroscopy in reduced ambient air and their performances in surface analysis

Suliyanti M.M.[a], Isnaeni[a], Pardede M.[b], Karnadi I.[c], Tanra I.[c], Iqbal J.[d], Bilal M.[e], Marpaung M.A.[f], Hedwig R.[g], Lie Z.S.[g], Ramli M.[h], Abdulmadjid S.N.[h]

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[d] Department of Physics, University of Azad Jammu and Kashmir, Muzaffarabad, 13240, Pakistan

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Abstract

A study is conducted on the detailed static and dynamic characteristics of plasma and the resulting emission spectral qualities generated by a femtosecond (fs) laser irradiation compared with those produced by nanosecond (ns) laser irradiation at a reduced ambient air pressure of 0.65 kPa. It is shown that both plasmas feature a tiny primary and a much larger secondary plasmas, which share the same hemispherical shape of roughly the same size at the appropriately chosen pulse energies. The resulted emission spectra in both cases exhibit one of the shock wave characteristics marked by a much stronger Zn triplet than its singlet emission lines. Further measurement of log(r)-log(t) of Cu I 521.8 nm emission line yields a slope of around 0.4, which is in good agreement with Sedov's equation derived for shock wave plasma. While exhibiting similar pressure-dependent emission intensities of Cu and Zn emission lines, the fs induced emission intensities are consistently lower than those induced by ns laser plasma. The estimated average temperature of the ns laser induced plasma (10 200 K) is only slightly higher than that induced by the fs laser (9800 K). The lower integrated emission intensity of fs plasma is related to previously reported lower electron density in fs laser-induced breakdown spectroscopy (fs-LIBS) and the faster decay of the associated continuum background, implying rapid diminution of ionized atoms and hence lower integrated emission intensity. Therefore, apart from cases demanding minimal surface damages, the simpler and less expensive ns-LIBS should be considered as a more favorable alternative for spectrochemical analysis. However, the applications to surface analysis do show that the fs laser offers higher detection sensitivity. A judicial selection is, therefore, strongly recommended.

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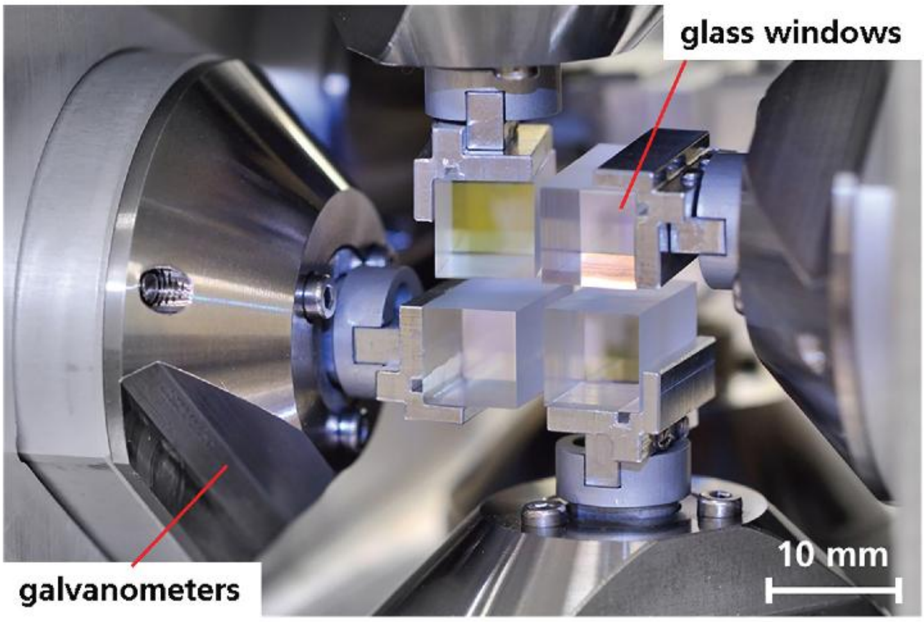

Volume 32, Issue 1, Feb. 2020

Design of multi-beam optics for high throughput parallel processing

J. Laser Appl. **32**, 012005 (2020); https://doi.org/10.2351/1.5125778

Oskar Hofmann, Jochen Stollenwerk, and Peter Loosen

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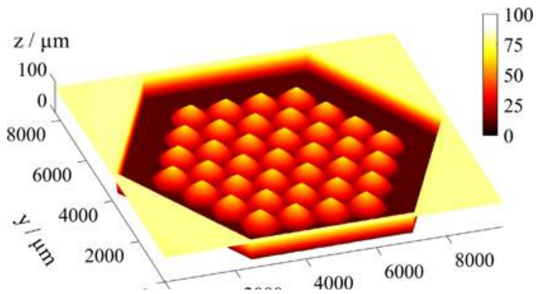

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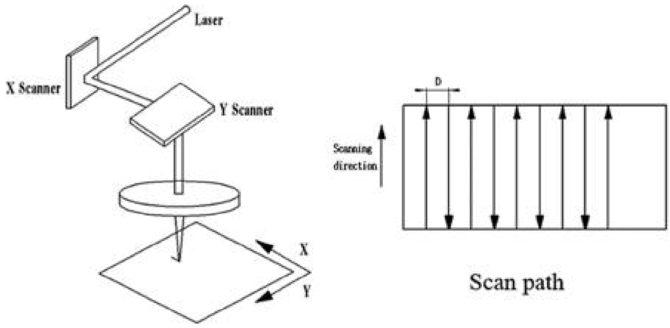

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Effect of laser surface melting pretreatment on the growth behavior and mechanical properties of microarc oxidation coating on Ti6Al4V alloy

Guolong Wu, Ye Wang, Min Sun, Qunli Zhang, Jianhua Yao and Volodymyr Kovalenko

Journal of Laser Applications **32**, 012013 (2020); https://doi.org/10.2351/1.5098000

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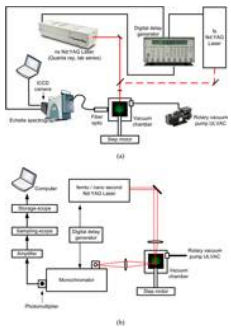

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Comparison of excitation mechanisms and the corresponding emission spectra in femto second and nano second laser-induced breakdown spectroscopy in reduced ambient air and their performances in surface analysis

Maria Margaretha Suliyanti, Isnaeni, Marincan Pardede, Indra Karnadi, Ivan Tanra, Javed Iqbal, Muhammad Bilal, Mangasi Alion Marpaung, Rinda Hedwig, Zener Sukra Lie, Muliadi

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ARTICLE

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Visualizing the trade-offs between laser eye protection and laser eye dazzle

Cite as: J. Laser Appl. **32**, 012008 (2020); doi: 10.2351/1.5132601
Submitted: 21 October 2019 · Accepted: 22 December 2019 ·
Published Online: 8 January 2020

View Online Export Citation CrossMark

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ABSTRACT

Visual detection and color discrimination become more challenging tasks when laser eye protection (LEP) is worn. This is due to the reduced light transmission and wavelength-blocking characteristics of LEP filters. LEP can, however, provide valuable protection against laser eye dazzle—the temporary reduction of vision caused by visible wavelength lasers. To understand this compromise, a model has been developed to allow the visual impacts of LEP to be simulated and balanced against their dazzle protection capabilities. This model is able to use any digital image as a background scene, allowing for real-world visualizations of LEP and dazzle over a broad range of scenarios. The work is built from the CIECAM02 color appearance model and a modified CIE general disability glare equation, together with experimentally validated adjustments to improve the accuracy of this application. The resulting model will help to inform LEP procurement and will serve as an educational tool for LEP users.

Key words: laser eye protection, laser eye dazzle, color vision, vision, coloration, simulation, training, glare, visualization

https://doi.org/10.2351/1.5132601

I. INTRODUCTION

Laser eye protection (LEP) is used to protect eyes from laser radiation. Traditionally, LEP in spectacle or goggle formats has been used by laboratory technicians and others working with lasers such as telecom engineers and medical practitioners. LEP provides protection by absorbing or reflecting specific wavelengths of laser light. This selective blocking of specific wavelengths in the visible band leads to a coloration being imparted on the vision of the wearer, potentially impacting visual performance.[1,2]

Lasers are capable of inducing two main effects on the human eye: damage and dazzle. Laser eye damage occurs when the retina receives enough laser energy to cause lesions or burns, potentially resulting in partial blindness.[3,4] Laser eye dazzle is a visual effect whereby visible laser light can saturate the photoreceptors in the eye, resulting in temporary loss of vision and flash blindness.[5–7]

The rising trend in laser incidents in civil aviation has necessitated the development of LEP for use outside controlled laboratory and industrial settings. The Civil Aviation Authority reported 775 laser illuminations against UK commercial aircraft in 2018,[8] while the Federal Aviation Authority reported 5663 incidents against U.S. commercial aircraft across the same period.[9] These incidents can be life threatening, particularly if they occur during critical phases of flight such as take-off or landing.[10,11] They are fueled by the availability of high power handheld lasers, often marketed as toys,[12] and capable of dazzling aircrew from kilometers away.[5] This development has extended the list of LEP users to include commercial pilots and police helicopter pilots who have also been targeted by users of these handheld devices.

For such applications, color discrimination is an important visual task for the LEP wearer.[13] This is particularly true in the use of cockpit instruments where information is communicated through color cues.[14] Therefore, a balance must be struck between LEP protection levels and visual impacts.[15] The more of the visible spectrum that is blocked, the more difficult it is to perform visual tasks. However, too low a protection level risks potentially dangerous laser exposures.

To understand this compromise, a model has been developed to allow the visual impacts of LEP and dazzle to be simulated together in realistic scenarios. This model allows a comparison of dazzle protection for specific dazzle parameters as well as chromatic and luminance effects between different LEP. This tool could be used in the procurement chain to illustrate coloration effects and protection levels provided by LEP. The outputs could also be used as an educational tool, demonstrating dazzle and how appropriate eyewear will benefit a user. As well as simulating real LEP products, it could also be used with theoretical LEP to demonstrate effectiveness and color balance before manufacture, thus saving production time and costs.

Journal of
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ARTICLE

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Eddy current detection of laser-dispersed markers as a new approach to determining the position of load supporting means

Cite as: J. Laser Appl. **33**, 042004 (2021); doi: 10.2351/7.0000486
Submitted: 2 July 2021 · Accepted: 9 August 2021 ·
Published Online: 14 September 2021

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Note: Paper published as part of the special topic on Proceedings of the International Congress of Applications of Lasers & Electro-Optics 2021.

ABSTRACT

The logistic industry has a steady need for improved positioning of goods to keep commercial success. Next to high accuracy, a low maintenance system is needed to ensure the benefits of automation. While state of the art position determination is done by mechanical, optical, or hydraulic techniques, this research addresses a new approach using laser-dispersed position markers and contactless eddy current technology for detection. A fiber laser is used to create thin melt tracks on lifting profiles, and zirconium oxide powder is added to the melt to create a dispersed track as a position marker. The influence of the laser process parameters on the track width and surface topology is determined, as well as the influence on eddy current measurements. It has been found that increasing the laser power and the powder feed rate of zirconium oxide in the investigated range from 190 to 490 W and 1.16 to 3.6 g/min, respectively, increased the signal from the eddy current sensor unit. Positioning concepts are examined by moving the eddy current sensor above the lifting profile with speeds up to 4000 mm/min. The laser-dispersed markers are clearly recognizable in the sensor signal with a minimum distance of 2 mm from each other and an interspace of 0.8 mm from the lifting profile to the sensor head. The recognition error rate is quite low at around 0.0037%. However, the resolution, which can be derived from the eddy current sensor signal, is about 0.5 mm ± 0.11 mm. In order to gain insight into the suitability of the examined technology for forklifts, the eddy current sensor is mounted on the fork bracket and typical actions are simulated. Last, other applications for eddy current detection of laser-dispersed markers, such as storing and reading information for component identification, are demonstrated.

Key words: laser dispersing, eddy current, position determination, forklifts

INTRODUCTION

Fast and precise height or position measurements of load supporting means are essential for the economic operation of deposits. Due to increasing automation, the aspects of low maintenance and reliability are getting more important too. The current position determination systems are based on mechanical, hydraulic, or optical systems. The most common mechanical systems use rolls and rotation angle measurement devices.[1] One negative aspect is inaccuracy through pollution and slippage. The hydraulic methods are based on measuring the height of the hydraulic fluid,[2] the volume flow of the hydraulic fluid,[3] or the hydrostatic pressure.[4] The disadvantages of these methods are temperature dependency or inaccuracy through vibrations. Both mechanical and hydraulic methods suffer from wear. Optical systems use runtime measurements to determine the lifting height of load supporting means.[5,6] A barrier and pollution-free optical path is necessary to achieve accurate results. In this article, a new approach to performing height measurements is presented that does not suffer from the sources of inaccuracy mentioned above. For this purpose, material inherent position markers are applied on mast profiles through laser dispersing and read out contactless by means of eddy current technology. The laser dispersion process is defined as a surface treatment in which the surface is locally melted and hard particles, such as ceramics, are applied to the melt pool. Typical applications are surface hardening of forging tools and increasing the wear