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

Judul Jurnal Ilmiah (Artikel)	:	Underlying physical processes for time dependent variations of He triplet and singlet intensities in laser-induced He plasma			
Nama/ Jumlah Penulis	:	16 Orang			
Status Pengusul	:	~~Penulis pertama~~/ Penulis ke 9 / ~~Penulis Korespondesi~~ **			
Identitas Jurnal Ilmiah	:	a.	Nama Jurnal	:	Journal of Applied Physics
		b.	Nomor ISSN	:	10897550, 00218979
		c.	Vol, No., Bln Thn	:	Vol. 127, No. 24, Juni 2020
		d.	Penerbit	:	AIP Publishing
		e.	DOI artikel (jika ada)	:	10.1063/1.5144689
		f.	Alamat web jurnal	:	http://scitation.org/journal/jap
			Alamat Artikel	:	https://aip.scitation.org/doi/pdf/10.1063/1.5144689
		g.	Terindex	:	Scopus

Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat) :

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- [ ] Jurnal Ilmiah Nasional Terakreditasi
- [ ] Jurnal Ilmiah Nasional Tidak Terakreditasi

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional [√]	**Nasional Terakreditasi** [ ]	**Nasional Tidak Terakreditasi** [ ]	
a. Kelengkapan unsur isi jurnal (10%)	4			3,3
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11,4
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			11,5
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,2
Total = (100%)	**40**			**37,4**
Nilai Pengusul = 20% x (37,4/15) = 0,50				

Catatan Penilaian artikel oleh Reviewer :

1. **<u>Kesesuaian dan kelengkapan unsur isi jurnal:</u>**
   Isi jurnal ditulis dengan kesesuaian antar bagian, memiliki gap riset yang jelas, jurnal ditulis dengan lengkap dan menenuhi unsur-unsur penulisan jurnal yang baik.
2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**
   Jurnal mmeiliki ruang lingkup jurnal spesifik, pembahasan telah didukung dengan literatur terkini dan memiliki kedalaman yang baik sesuai dengan hasil yang diperoleh dan focus pada gap riset yang dikemukakan.
3. **<u>Kecukupan dan kemutakhiran data/informasi dan metodologi:</u>**
   Jurnal memiliki kecukupan data yang memadai yang diperoleh dari instrument yang baik, menggunakan metodologi riset yang telah sesuai yang didukung dengan referensi jurnal terbaru, sebaiknya dikurangi referensi jurnal yang lebih dari 5 tahun terakhir, jumlah referensi sebaiknya di tambah.
4. **<u>Kelengkapan unsur dan kualitas terbitan:</u>**
   Jurnal telah memiliki kelengkapan unsur yang baik dan kualitas terbitan yang cukup baik, jurnal yang terindek scopus, memiliki indek similaritas yang kecil.

Semarang, 20 April 2021
Reviewer 1

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Unit Kerja : Fisika
Bidang Ilmu: Fakultas Sains dan Matematika

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		g. Terindex : Scopus

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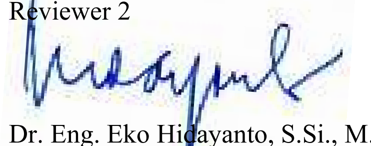
Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional [√]	Nasional Terakreditasi [ ]	Nasional Tidak Terakreditasi [ ]	
a. Kelengkapan unsur isi jurnal (10%)	4			3,6
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11,6
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			11,4
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,5
Total = (100%)	**40**			**38,1**
Nilai Pengusul = 20% x (38,1/15) = 0,51				

Catatan Penilaian artikel oleh Reviewer :

1. **<u>Kesesuaian dan kelengkapan unsur isi jurnal:</u>**
   Isi jurnal sangat sesuai dan lengkap dari komponen-komponen yang ada abstrak, pendahuluan, prosedur eksperimen, hasil dan pembahasan, lalu kesimpulan dan daftar pustaka yang digunakan.
2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**
   Paper ini membahas tentang variasi bergantung waktu dari emisi utama dari eksitasi metastabil yang dihasilkan He dalam berbagai kondisi percobaan pada spektroskopi plasma yang diinduksi laser spektrokimia.
3. **<u>Kecukupan dan kemutakhiran data/informasi dan metodologi:</u>**
   Data-data/informasi serta metodologi yang digunakan sangat mutakhir.
4. **<u>Kelengkapan unsur dan kualitas terbitan:</u>**
   Karya ini diterbitkan dalam jurnal berkualitas Q2 dengan SJR 0,7 oleh American Chemical Society dengan unsur-unsur yang lengkap serta kualitas yang sangat baik.

Semarang, 02 Juli 2021
Reviewer 2



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g. Terindeks di Scimagojr/Scopus ~~atau di….~~**

Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat) :
[√] ~~Jurnal Ilmiah Internasional~~ / Internasional Bereputasi **
[ ] Jurnal Ilmiah Nasional Terakreditasi
[ ] Jurnal Ilmiah Nasional/Nasional Terindeks di DOAJ, CABI, COPERNICUS**

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi jurnal (10%)	3,3	3,6	3,45
b. Ruang lingkup dan kedalaman pembahasan (30%)	11,4	11,6	11,5
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	11,5	11,4	11,45
d. Kelengkapan unsur dan kualitas penerbit (30%)	11,2	11,5	11,35
Total = (100%)			**37,75**
Nilai untuk Pengusul : 20% x (37,75/15) = 0,50			

Semarang, 24 Februari 2021

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Underlying physical processes for time dependent variations of He triplet and singlet intensities in laser-induced He plasma

Jobiliong E.[a], Pardede M.[b], Hedwig R.[c], Karnadi I.[d], Tanra I.[d], Lie Z.S.[e], Kurniawan K.H.[f], Lie T.J.[f], Khumaeni A.[g], Marpaung A.M.[h], Abdulmadjid S.N.[i], Idris N.[i]

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[c] Computer Engineering Department, Faculty of Engineering, Bina Nusantara University, Jakarta, 11480, Indonesia
[d] Department of Electrical Engineering, Krida Wacana Christian University, Jakarta, 11470, Indonesia
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Abstract

A series of experiments are conducted for the study of time-dependent variations of major emission from the metastable excited He generated in various experimental conditions. Different Nd:YAG laser pulse widths and pulse energies, as well as purity of the He gas, are employed for studying quenching effects including the use of a Cu target in an experimental condition for spectrochemical analysis. It is found that in all cases investigated, the metastable excited He atom (He*) associated with the triplet He I 587.5 nm emission line has the unquestionable dominance over another triplet emission line of He I 388.8 nm and the singlet He I 667.8 nm emission. Further analysis of the present data combined with the results of previous studies suggested that the energy transfer between He atoms via the Penning-like collision-induced energy transfer process has so far remained less than appropriately addressed. It is strongly argued and demonstrated in this work that this underlying physical process is likely the moving force leading to the repeated He ionizations responsible for the self-propelled multiple amplification of the triplet He I 587.5 nm emission intensity particularly at the early stage of the shock wave formation. This study has convincingly demonstrated that the Penning-like collision-induced energy transfer process can also effectively take place between He* and the ablated atoms, implying its usefulness for spectrochemical laser-induced plasma spectroscopy analysis.

Indexed keywords

SciVal Topics

Metrics

Funding details

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André Anders studied physics in Poland, (East) Germany, and Russia (then Soviet Union) and earned his Ph.D. in physics at Humboldt University Berlin, Germany, in 1987. Following appointments as staff scientist at the Central Institute for Electron Physics in (East) Berlin, Germany, and the Max Planck Institute for Plasma Physics in Garching, Germany, Dr. Anders joined Lawrence Berkeley National Laboratory (LBNL) in Berkeley, California, in 1992 and served as senior scientist and leader of the Plasma Applications Group until 2017. He is currently a Professor of Applied Physics at the Felix Bloch Institute of the University of

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Research Interests: Plasma physics and materials science, including coatings and thin film synthesis, high power impulse magnetron sputtering, cathodic vacuum arc plasma and ion sources, gas plasma sources, ion implantation, and plasma immersion ion implantation, transparent conducting oxides, and electrochromic materials.

Professional Activities and Awards: Fellow of the American Physical Society, Fellow of the American Vacuum Society, Fellow of the Fellow of the Institute of Electrical and Electronics Engineers, and Fellow of the Institute of Physics. Dr. Anders has been recognized through numerous awards, including the Walter Dyke Award, the highest award of the International Symposia of Electrical Discharges and Insulation in Vacuum (2014); the Mentor Award of the Society of Vacuum Coaters (2011); the IEEE Merit Award of the IEEE Nuclear and Plasma Sciences Society (2010); and the Chatterton Award (1994).

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Christian Brosseau received his Ph.D. in physics from the Université Joseph Fourier, Grenoble, France, in 1989. After a research associate position at that university, he moved to the Université de Bretagne Occidentale, Brest, France, in 1994 as an associate professor in the Department of Physics. In 2010, he became a distinguished professor in the department, where he remains today.

Research Interests: Magnetism and electromagnetic wave propagation in complex media, plasmonics, image processing (polarization), nanophysics, biological physics, and computational materials physics.

Professional Activities and Awards: Fellow of the Optical Society of America, Fellow of the Institute of Physics, and Fellow of the Electromagnetics Academy. Dr. Brosseau has served on the editorial boards of *Optics Communications* (2005-2008), *Optics Letters* (2005-2010), and the *American Journal of Physics* (2008-2010). He continues to serve on the boards of *Nanotechnology, the Journal of Nanomaterials,* and *Progress in Optics.* A prolific author, with 186 articles in international journals and three book chapters, his publications have been cited more than 4600 times. He also holds two patents.

Laurie E. McNeil

The University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Laurie McNeil obtained her Ph.D. in physics from the University of Illinois in 1982 and spent two years as an IBM Postdoctoral Fellow at the MIT Center for Materials Science and Engineering. She then joined the faculty at the University of North Carolina at Chapel Hill (UNC-CH). She is the Bernard Gray Distinguished Professor in the Department of Physics and Astronomy at UNC-CH and chaired the department from 2004-2009. She was also interim chair of the Curriculum in Applied and Materials Sciences from 2007-2008.

Research Interests: Optical spectroscopy of semiconductors and insulators and materials physics of crystalline organic semiconductors for electronic applications.

Professional Activities and Awards: Fellow of the American Physical Society and Chapman Faculty Fellow and Academic Leadership Fellow in the Institute for the Arts and Humanities at UNC-CH. Dr. McNeil has received numerous awards, including the William F. Little Award for Distinguished Service from UNC-CH. Active within her professional community, she has chaired both the Southeastern Section of the American Physical Society and the APS Committee on the Status of Women in Physics. She is currently co-chair of the APS/AAPT Joint Task Force on Undergraduate Physics Programs (J-TUPP).

Simon R. Phillpot
University of Florida, Gainesville, FL, USA

Simon Phillpot received his Ph.D. in physics from the University of Florida in 1985. After a postdoctoral fellowship at Xerox Webster Research Center, he worked at Argonne National Laboratory for 16 years, first as a postdoctoral associate and then as a physicist and group leader in the Materials Science Division. Returning to the University of Florida in 2003 as a professor in the Department of Materials Science and Engineering, he became chair of the department in 2010. In addition, he was also was appointed professor of nuclear engineering and was director of the Nuclear Engineering Program from 2011 to 2014.

Research Interests: Phonon-mediated heat transfer in ceramics, deformation behavior of metals, dielectric and ferroelectric properties of oxides, nuclear materials, and simulation methodology development.

Professional Activities and Awards: Fellow of the American Physical Society, Fellow of the American Association for the Advancement of Science, Fellow of the Institute of Physics, and Fellow of the Institute of Materials, Minerals and Mining. In 2011, Thomson Reuters named Dr. Phillpot as one of the Top 100 most influential materials scientists worldwide. He is the author/co-author of over 240 peer-reviewed publications, including “Nanoscale Thermal Transport" in *Applied Physics Reviews,* 93, 793-818, (2003), which has been cited over 1600 times.

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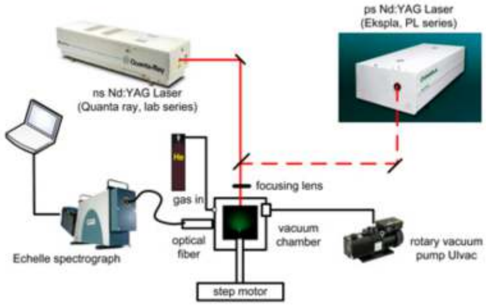

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Underlying physical processes for time dependent variations of He triplet and singlet intensities in laser-induced He plasma

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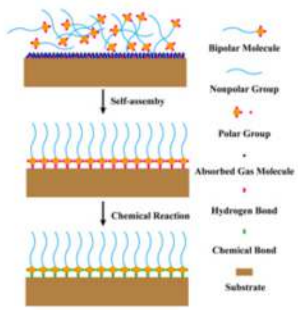

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Synchrotron x-ray computed microtomography for high pressure science

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ABSTRACT

X-ray computed microtomography (XCT) has been a very promising and exciting technique for high pressure (HP) science since the introduction of the first HP setups optimized for tomography in the mid-2000s. Different experimental stations are now available using diamond anvil cells (DACs) or large volume presses, with their own benefits and limitations: access to very high pressures but at room temperature on one hand, high temperature (HT) at moderate pressures on the other, and slow acquisitions being an undesired common point between all techniques. We believe that we are at a turning point where current and future developments boost the interest of the technique for the HP community. Time-resolved experiments, with less than 1 s per tomogram, will become routinely available. Fast tomography will greatly reduce the problem of motion artifacts at HT, allowing new topics to be explored. Computing and data treatment issues must be taken into account to effectively exploit the large volumes of data produced. Foreseeable developments will allow higher pressures to be reached in larger volume presses and higher T in DACs. Furthermore, improved XCT resolution in large samples (several hundreds of μm in diameter) recorded *in situ* will offer to be an effective alternative to *ex situ* microscopy.

I. INTRODUCTION

X-ray computed tomography (XCT) is a powerful non-destructive technique used to reconstruct 3D images of the internal structure of objects with a high spatial resolution, from 1 mm down to a few tens of nanometers. Basically, the technique consists in collecting radiographs of the sample at multiple angles, which are then used to compute the 3D internal structure of the object. The fact that the sample is generally not damaged during the imaging process is one of the major features of the technique that makes possible the study of not only living specimens or precious/unique objects but also of *in situ* phenomena as in material science, for example. From its development in the late 1960s through the late 1980s,[1] the technique has massively grown in popularity, in line with the advances in detection, computing power, and storage capacity. It is now routinely used in medical science, biology, paleontology, materials science, engineering, geophysics, and environmental science. Two main types of systems are available: laboratory systems using x-ray tubes and synchrotron-based experimental stations. While both types of instruments have progressed rapidly, the high flux and partially coherent parallel beam produced in synchrotrons can generate high quality images in a much shorter timeframe, at an energy that can be easily tailored to the sample nature and experiment needs.[2,3] Monochromatization of the beam removes beam-hardening artifacts, a phenomenon linked to the selective attenuation of lower energy photons in a polychromatic beam. The partially coherent beam provides phase contrast, allowing very subtle structural changes in the sample to be detected in a way that sometimes traditional microscopy cannot. This has revolutionized certain scientific fields such as paleontology in the last few decades.[4]

The strengths of the technique for high pressure science are obvious. All types of microstructural changes and volume modifications are expected from samples undergoing compression: deformation, phase transitions, melting, flow, and redistribution of phases. Applications in many different fields are huge: geophysics (igneous petrology, rheology, equations of state of liquids, and amorphous materials), chemistry (phase transitions), and materials science (microstructure, damage). While XCT on recovered samples has proven to be very efficient,[5–8] some of these phenomena can

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Advanced polymer dielectrics for high temperature capacitive energy storage

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ABSTRACT

Dielectric polymers are critical to meet the increasing demands for high-energy-density capacitors operating in harsh environments, such as aerospace power conditioning, underground oil and gas exploration, electrified transportation, and pulse power systems. In this perspective article, we present an overview of the recent progress in the field of polymer dielectrics for high temperature capacitive energy storage applications. Particular attention is placed on the underlying physical mechanisms of the rational design and the material structure–dielectric property–capacitive performance relationship. The scientific and technological challenges that remain to be addressed and the opportunities for future research are also presented.

I. INTRODUCTION

Dielectric materials are the basis of a fundamental electric circuit element, dielectric capacitor, which can be found in almost all electric circuits.[1–4] Dielectric capacitors are used to control and store electric charge and electrical energy in electrical and electronic devices,[5,6] such as electric power converters, pulse power systems, and electric power systems. For example, dielectric capacitors convert the DC electricity from sources such as batteries to AC electricity in the power inverters of hybrid electric vehicles (HVEs), in which motors are driven by AC power.[7] Compared with their ceramic counterparts, polymer dielectrics possess the intrinsic advantages of high breakdown strength, low energy loss, excellent mechanical flexibility, great reliability, low cost, and being lightweight, which make them an ideal material choice for high-energy-density capacitors.[8–12]

With the booming demands for capacitors with applications in various extreme conditions,[13] e.g., aerospace,[14] underground oil and gas exploration,[15] electrified transportation, and advanced electromagnetic systems,[16] there is an urgent need for dielectric capacitors capable of functioning efficiently under elevated temperatures and high electric fields. For example, the near-engine temperature in HVEs can reach above 140 °C. The utilization of wide bandgap semiconductors, e.g., silicon carbide (SiC) and gallium nitride (GaN), boosts the operation temperature of capacitors used in future power electronic devices beyond 150 °C.[15] However, the state-of-the-art biaxially oriented polypropylene (BOPP) film can only operate under 105 °C.[17] A secondary cooling system is thus required to accommodate the BOPP-based capacitors in the harsh-environment applications,[18] which unfortunately introduces extra volume, weight, and energy costs.[19–21] In some applications, the temperature requirement of capacitors is even more challenging, e.g., the operation temperature for capacitors used in underground oil and gas exploration and electrified aircrafts can exceed 200 °C and 250 °C, respectively, which makes the additional cooling system very costly or even impossible.

To meet the urgent demands of high-temperature high-energy-density capacitors, extensive research on high temperature polymer dielectrics has been conducted.[22–26] Typically, there are two main obstacles to the development of high temperature polymer dielectrics. One is the low thermal stability, and the other is the large conduction current under high temperatures and high electric fields. The thermal stability of polymer dielectrics is relatively low because of their low glass transition temperatures, which not only restricts the operation temperature of polymer dielectrics but also decreases the dielectric performance at high temperatures. A general strategy to improve the thermal stability of polymer dielectrics is to introduce rigid components in the structures, such as aromatic rings, heteroaromatic rings, hydrogen bonds, and high-strength chemical bonds. A variety of high thermal stability polymers have been exploited as high temperature polymer dielectrics, including polycarbonate (PC),