



**SDI Review Form 1.6**

Journal Name:	<a href="#">Physical Review &amp; Research International</a>
Manuscript Number:	2013_PRR1_6986
Title of the Manuscript:	<b>Measurements of absolute atomic oxygen density by two-photon absorption laser-induced fluorescence spectroscopy in hot air plasma generated by microwave resonant cavity</b>
Type of the Article	<b>Research Paper</b>

**General guideline for Peer Review process:**

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



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### PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<b>Compulsory</b> REVISION comments	<ol style="list-style-type: none"> <li>1. Please improve most of the figure, such that axis and captions can be read easily, e.g., see Fig. 14 and others.</li> <li>2. Please improve the grammar, many hints are in the Minor revision sections</li> <li>3. Include some more details RE non-LTE and/or the LTE assumption mentioned in Abstract.</li> </ol>	<p>The authors are grateful to the referee for careful reading of the manuscript and constructive suggestions aimed to improving the text. The reply is given hereafter and the text amendments are yellow highlighted in the manuscript.</p> <p>1. Figures was improved (please see figs 5,6,10,11,13,14 and 15)</p> <p>2. English was also improved (please see some yellow and also green highlighted texts of the revised version)</p> <p>3. Some details are added on page 14, lines 433-436</p>
<b>Minor</b> REVISION comments	<p>In Abstract: "about <math>2.1 \times 10^{17} \text{ cm}^{-3}</math>" (not 2.05)</p> <p>In Introduction: "...gas, vibration and rotation species..." (insert 'and rotation'); "...therein that describe in ..." (not 'describing'); "... used to generate the..." (not 'generating'); "..., the TALIF method is described together with the formalism of the calibration..." (not 'it is first recalled the TALIF...')</p> <p>In 2.1: "...allows maximum field... (not 'the maximization'); "...equipped with..." (not 'equipped by'); "...equipped with synthetic fused silica windows..." (not 'glass windows made by...' – glass usually is opaque to uv radiation, silica is transparent, so use</p>	<p>Thank you very much for these suggestions that make the text clearer for the reader. They are all considered in the revised version (please see the yellow highlighted text)</p>



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	<p>“...fused silica windows...”; “..equipped with a ...” (not ‘by’); use a comma after pumping system to read “...pumping system, and ...”; use “... in order to suppress thermal ...” (not ‘avoid any’); “...equipped with special windows...” (not ‘by’ and use plural ‘windows’); “...injected from below the ...” (not ‘injected in the down side of the’); “schematic” (note ‘scheme’); “...using a lens” (insert ‘a’); “The emitted radiation is guided...” (not ‘The emitted photons are..’); “The spectrum is recorded..” (not ‘is given’); In 2.2: “Nd:YAG” (not ‘Nd: YAG’ – no space); “The spectral width of the laser radiation in the ... (not ‘width beam...’); “...463 nm, measured using two 1800 grooves/mm gratings, amount to ...” (not ‘by a dual of’); “... that allows us to excite the two-photon transition from ... to” (‘allows us to’)</p> <p>-----</p> <p>At end of first paragraph in 2.2, please indicate f# (f#=focal length/diameter on lens) as well.</p> <p>Please consider 2<sup>nd</sup> sentence in 2<sup>nd</sup> paragraph: “A 70 mm focal length lens is used for imaging onto the photocathode of a photomultiplier (...) Is this what was intended?</p> <p>“... 5ns resolution.” (not ‘5ns of resolution’); “A more detailed description of our experimental arrangement is presented elsewhere.” (Is this correct? ‘ more detailed’)</p>	<p>This information is added in the revised version: f#=75mm/24.5mm= (in fact the syntax error on the focal length (equal to 75mm) is also corrected 75 mm</p> <p>This sentence was rephrased in the revised version “The laser focus is imaged onto the photocathode of a photomultiplier (PMT HamamatsuH7421-50) working in a single photon counting mode, by using BK7 lens with the ratio f/D=75/25 (i.e. 75 mm focal length over 25 mm diameter).”</p> <p>The sentence “more detailed ... “ was changed by “Further details on the laser setup and the electronic recording devices from photo-multiplier to multi-channel analyzer can be found elsewhere<sup>7</sup>.”</p>
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	<p>In 3.1: “Laser radiation is focused into...” (not ‘the principle consists to..’; “and this is why” is not needed but consider to simply use “...; a high photon flux is required for two-photon excitation of atomic oxygen.”; use “may not be” (not ‘cannot always be’)</p> <p>-----</p> <p>Can you include some cross-sections/numbers to substantiate your arguments just above 3.2 ?</p> <hr/> <p>Line 203: clarify symbol Line 210: red “into” not needed but a period after account. Line 213: Lorentzian (capital L) Line 216: clarify symbol Line 228: perhaps use ‘saturation’ rather than depletion. Line 258: centered (not centred—this is an issue of British vs American English)</p> <p>Line 272: equation symbols! And equation number required! Line 289: Are there more than 3 points measured?</p> <p>Line 302: Can you describe in a few words what exactly is done when you say “using Luke et al. software.” ??</p>	<p>This is taken into account in the revised version.</p> <p>Cross section data was given in section 3.2 with two references 8 and 9 (page 9): <math>\sigma_{Xe}^{(2)} \approx 2,5 \times 10^{-35} \text{ cm}^4</math> (Ref ) and <math>\sigma_O^{(2)} \approx 1,3 \times 10^{-35} \text{ cm}^4</math> (Refs 8 and 9).</p> <p>The following issues (lines 203 to 272) are fully considered.</p> <p>The equation is numbered and its symbols are defined. 5 points are measured along radial direction (2 points was lead to very low density) Luque software (or Lifbase) can be downloaded (<a href="http://lifbase.software.informer.com/download/">http://lifbase.software.informer.com/download/</a>) for calculations of some molecular spectra versus several parameters as for instance rotation and vibration temperatures. OH spectrum is chosen as a “thermometer” for rotation (or gas) temperature measurement because it depends only on rotation temperature. Then, gas temperature is obtained for the best fit between calculated and experimental spectra.</p>
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