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| Book Name: | **Plasmas Afterglows with N2 for Surface Treatments synthesis 2024** |
| Manuscript Number: | **Ms\_BPR\_** **3686.1** |
| Title of the Manuscript:  | **Plasma Electron Collisions and Optical Spectroscopy** |
| Type of the Article | **Book chapter** |

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| PART 1: Review Comments |
| Compulsory REVISION comments | Reviewer’s comment | Author’s Feedback *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.** | While the manuscript addresses a critical aspect of plasma physics, plasma electron collisions and optical spectroscopy, it lacks the depth and cohesiveness expected of a book chapter. Book chapters are intended to be highly descriptive, providing readers with a comprehensive understanding of the topic. Unfortunately, the current manuscript appears fragmented, with significant gaps in context, explanation, and structure. While the content may be useful for specialists already familiar with the subject, it falls short in offering a clear and engaging narrative for a broader audience.While the manuscript incorporates essential theoretical equations and practical examples, it struggles to deliver a reader-friendly, descriptive format. The abrupt introduction, lack of a structured flow, and insufficient explanation of the context and importance of the topic undermine its accessibility. Moreover, the figures, while numerous, are not adequately integrated into the text or explained in detail, which detracts from their educational value.I particularly dislike the introduction, which begins with "It is shown in this chapter..." without first establishing the relevance, background, or significance of the topic. The chapter lacks a compelling narrative to draw the reader in, and its heavy reliance on technical jargon further limits its accessibility. |  |
| **Is the title of the article suitable?****(If not please suggest an alternative title)** | Yes, the title "Plasma Electron Collisions and Optical Spectroscopy" accurately reflects the manuscript's content. It succinctly captures the core topics discussed. No changes are necessary. |  |
| Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here. | I cannot comment on this aspect as an abstract was not provided along with the manuscript. |  |
| **Are subsections and structure of the manuscript appropriate?** | The subsections cover relevant topics, but their arrangement and descriptions lack coherence. For a book chapter, the structure should guide readers through the topic logically, starting with fundamental concepts, moving to detailed explanations, and concluding with applications and future directions. The manuscript, however, dives straight into calculations and equations without adequately introducing the foundational concepts.Suggested Improvements to Structure:1. Introduction: Expand the introduction to include a detailed explanation of plasma diagnostics, the role of optical spectroscopy, and the importance of nitrogen plasmas. The final paragraph should outline the chapter structure.
2. Theoretical Background: Include a separate section that thoroughly explains the theoretical principles behind plasma electron collisions and spectroscopy for readers unfamiliar with the topic.
3. Diagnostic Techniques: Group all spectroscopy-related subsections together, providing clear distinctions between emission spectroscopy, resonant absorption spectroscopy, and Raman spectroscopy.
4. Applications and Future Directions: Conclude with a discussion on the practical applications of the described techniques, as well as current challenges and future prospects in plasma diagnostics.
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| **Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.** | The manuscript is scientifically robust as it combines well-established theoretical models, such as the Boltzmann and Franck-Condon principles, with experimental techniques validated through clear references and data. It offers detailed derivations of key equations and provides their application in practical plasma systems. The integration of emission spectra analysis and diagnostics of electron, vibrational, and rotational temperatures further solidifies its technical depth and relevance.Areas for improvement:* Some of the theoretical explanations could benefit from clearer explanations or examples to aid readers who may not have a strong background in plasma spectroscopy.
* Experimental limitations, such as uncertainties in measurements, are discussed but could be elaborated further to give readers a clearer understanding of the challenges involved.
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| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.****-** | The references cited are relevant and sufficient, covering both foundational studies and more recent advancements in the field. However, a few newer references (post-2015) could be incorporated to address recent developments in plasma diagnostics, particularly in optical and laser spectroscopy. |  |
| Minor REVISION commentsIs the language/English quality of the article suitable for scholarly communications? | The language is generally suitable for scholarly communication, but there are instances of minor grammatical errors, awkward phrasing, and typographical issues. Revising these for grammatical precision and readability would enhance the manuscript's overall quality. |  |
| Optional/General comments | This manuscript contains valuable information and technical depth, its poor organization, lack of descriptive detail, and inaccessible writing style undermine its value. To meet the standards of a book chapter, the manuscript needs substantial revisions, including:* A rewritten introduction with context and structure.
* A clear and logical organization of subsections.
* Detailed explanations of theoretical concepts and diagnostic techniques.
* More recent and diverse references.

With these revisions, the chapter could become a valuable resource for students and researchers in plasma physics and spectroscopy.  |  |

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| **PART 2:**  |
|  | **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)* |
| **Are there ethical issues in this manuscript?**  | *(If yes, Kindly please write down the ethical issues here in details)* |  |

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| **Reviewer Details:** |
| Name: | **Pronama Biswas** |
| Department, University & Country | **Dayananda Sagar University, India** |