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| Book Name: | [**Physical Science: New Insights and Developments**](https://bookstore.bookpi.org/product/physical-science-new-insights-and-developments-vol-1/) |
| Manuscript Number: | **Ms\_BPR\_6157** |
| Title of the Manuscript: | **Analytic Approximate for the Plasma Sheath Potential** |
| Type of the Article | **Book Chapter** |

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| PART 1: Comments | | |
|  | Reviewer’s comment **Artificial Intelligence (AI) generated or assisted review comments are strictly prohibited during peer review.** | 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. A minimum of 3-4 sentences may be required for this part.** | **This manuscript addresses the problem of finding accurate analytic approximations for the Bohm sheath potential, a classical challenge in plasma physics. The work is important because:**   1. **It provides a new exponential-type approximation valid for all values of the characteristic parameter K, including the critical case K=1/2, where previous approximations fail.** 2. **The proposed method incorporates both ion velocity (K) and wall potential (φw​) into the exponential parameter, improving robustness and physical relevance.** 3. **The results have applications in plasma confinement, fusion devices, and surface interactions, where sheath modeling is essential.** 4. **The work extends previous studies by offering a simpler yet more general analytic form, which will be valuable for both theoretical studies and practical plasma simulations.** |  |
| **Is the title of the article suitable?**  **(If not please suggest an alternative title)** | **The title *“Analytic Approximate for the Plasma Sheath Potential”* is clear but could be slightly improved for readability. Suggested alternative: “An Analytic Approximation for the Bohm Plasma Sheath Potential”** |  |
| 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. | * **The abstract is concise and clearly states the main contribution (new approximation valid for any K).** * **However, it could be slightly expanded to include:**   + **A clear statement of the physical motivation (importance of sheath models in plasma physics).**   + **A brief mention of comparison with previous approximations and error analysis results.**   **Suggested addition: *“The proposed method is shown to remain valid even at K=1/2, a regime where earlier approximations fail, and numerical comparisons confirm improved accuracy.”*** |  |
| **Is the manuscript scientifically, correct? Please write here.** | * **The manuscript is scientifically sound.** * **The derivation of the new approximation is well motivated, consistent with the Poisson equation, and validated through comparison with previous approaches.** * **Figures (comparisons and error plots) strengthen the claims.** * **The conclusion appropriately highlights novelty and limitations.**   **No major flaws detected.** |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.**  **-** | ** References are relevant but somewhat limited (oldest from 1949, others mainly before 2016).**  ** Recent developments in plasma sheath theory or kinetic simulations (post-2018) could be added to improve the scholarly context.**  ** Suggested addition:**   * **Reviews or articles on sheath modeling in fusion edge plasmas from the last 5 years.** |  |
| Is the language/English quality of the article suitable for scholarly communications? | The manuscript is understandable but requires moderate language editing:   * Correct “Bhom” → **“Bohm”** (appears several times). * Correct spelling/grammar issues: e.g., “demensionless” → **“dimensionless”**, “wich” → **“which”**, “depended of” → **“dependent on”**. * Improve flow in some sentences for clarity. |  |
| Optional/General comments |  The authors may wish to expand the *Conclusion* to include future perspectives (e.g., possible extensions of the approximation to multi-species plasmas or magnetized cases).   Figures should include clear legends and axis labels in standard notation (φ, y).   Ensure all equations are consistently numbered and formatted. |  |

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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)* |  |

**Reviewer details:**

**Abdelmounaim Laassouli, Morocco**