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Book Name:	<a href="#">Current Research Progress in Physical Science</a>
Manuscript Number:	<b>Ms_BPR_4090</b>
Title of the Manuscript:	<b>EXPLORING THE CONFINEMENT REGIME IN SPHERICAL ZnO , CdS, and CdSe COLLOIDAL (STAND ALONE) QUANTUM DOTS</b>
Type of the Article	<b>Book chapter</b>

**PART 1: Comments**

	<b>Reviewer's comment</b>	<b>Author's Feedback</b> <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
<b>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.</b>	This manuscript is a significant contribution to the scientific community, particularly in the field of nanoscience and quantum materials. It offers valuable insights into the confinement regimes of zinc oxide (ZnO), cadmium sulphide (CdS), and cadmium selenide (CdSe) quantum dots, which are critical for optimizing their optical and electronic properties. By exploring the confinement effects through theoretical and computational methods, this study aids in understanding how these quantum dots can be tailored for specific applications, such as optoelectronics and transistors. Furthermore, it establishes a foundation for future research into nanostructures, potentially driving advancements in device performance and material design.	
<b>Is the title of the article suitable? (If not please suggest an alternative title)</b>	The title of the manuscript, " <b>Exploring the Confinement Regime in Spherical ZnO, CdS, and CdSe Colloidal (Stand Alone) Quantum Dots,</b> " is fairly descriptive and reflects the core content of the study. However, it could be refined for better clarity and impact. For instance:  <b>Suggested Alternative Titles:</b>  <ol style="list-style-type: none"> <li>1. Quantum Confinement Regimes in Spherical ZnO, CdS, and CdSe Colloidal Quantum Dots: Insights and Implications</li> <li>2. Theoretical and Computational Analysis of Confinement Effects in Spherical ZnO, CdS, and CdSe Quantum Dots</li> <li>3. Unveiling Quantum Confinement in Colloidal ZnO, CdS, and CdSe Quantum Dots: A Study of Optical and Electronic Behavior</li> </ol>	

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<p><b>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.</b></p>	<p>The abstract is generally informative and provides a good overview of the study, including the focus on quantum confinement effects in ZnO, CdS, and CdSe colloidal quantum dots, their computational and theoretical analysis, and their potential applications. However, it could benefit from some refinements for clarity, completeness, and impact.</p> <p><b>Suggestions for Improvement:</b></p> <ol style="list-style-type: none"> <li><b>Clear Objectives:</b> The abstract briefly mentions the investigation but does not clearly define the objectives or the research question. Including a statement about the specific goals of the study would provide clarity. <ul style="list-style-type: none"> <li>Example: "This study aims to delineate the confinement regimes and their impact on the optical and electronic properties of these quantum dots."</li> </ul> </li> <li><b>Methodology:</b> While the abstract mentions computational simulation and theoretical analysis, it could include a brief mention of the methods used to provide a sense of the research rigor. <ul style="list-style-type: none"> <li>Example: "Through computational simulations and theoretical frameworks, the confinement regimes were systematically analyzed."</li> </ul> </li> <li><b>Key Results:</b> The results are not highlighted in detail. Including a sentence about key findings, such as the size ranges for strong, intermediate, and weak confinement regimes, would add value. <ul style="list-style-type: none"> <li>Example: "The study identifies size-dependent confinement regimes and their corresponding energy levels, offering insights into tailoring these quantum dots for specific applications."</li> </ul> </li> <li><b>Applications:</b> The potential applications are briefly mentioned, but their significance could be emphasized more strongly. <ul style="list-style-type: none"> <li>Example: "These findings pave the way for advancements in high-performance field-effect transistors, optoelectronic devices, and photonic technologies."</li> </ul> </li> <li><b>Remove Redundancy:</b> Phrases like "quantum confinement effects dictate the optical and electronic behaviors" are reiterated. Streamlining to avoid redundancy would improve readability.</li> </ol> <p><b>Suggested Revised Abstract:</b></p> <p>"Quantum dots (QDs) exhibit unique optical and electronic properties due to quantum confinement effects, making them promising candidates for various applications. This study investigates the confinement regimes of colloidal spherical ZnO, CdS, and CdSe quantum dots through computational simulations and theoretical analysis. The results delineate size-dependent confinement effects, revealing critical size ranges for strong, intermediate, and weak confinement regimes and their associated energy levels. These findings provide valuable insights into optimizing quantum dot performance for applications in optoelectronics, field-effect transistors, and photonic technologies, advancing the understanding of these semiconductor nanostructures.</p>	
<p><b>Is the manuscript scientifically, correct? Please write here.</b></p>	<p>Based on the content provided in the manuscript, it appears to be scientifically sound and aligns with established principles in quantum mechanics, material science, and nanotechnology. The study covers critical aspects such as:</p> <ol style="list-style-type: none"> <li><b>Explanation of Quantum Confinement:</b> The manuscript correctly describes the quantum confinement effect and its dependence on factors like size, shape, and material composition.</li> <li><b>Material-Specific Parameters:</b> Parameters such as band gap energy, effective mass of carriers, and exciton Bohr radius are accurately incorporated, which are essential for studying quantum confinement.</li> <li><b>Use of Established Models:</b> The study utilizes well-known equations and models, such as the Brus equation, to compute confinement energy and other relevant properties, which are appropriate for such investigations.</li> <li><b>Theoretical Foundations:</b> The manuscript includes robust theoretical discussions, linking</li> </ol>	

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	<p>quantum mechanics concepts (e.g., de Broglie wavelength, Bohr radius) with the physical behavior of quantum dots.</p> <p>5. <b>Applications:</b> The potential applications in optoelectronics and other fields are consistent with the properties of the materials studied.</p> <p><b>Points of Potential Improvement or Clarification:</b></p> <ol style="list-style-type: none"> <li>1. <b>Validation of Results:</b> While the methodology appears rigorous, the manuscript would benefit from a clear statement about whether the results were validated against experimental data or other theoretical studies. This comparison would strengthen the scientific reliability of the findings.</li> <li>2. <b>Clarity in Data Presentation:</b> Certain sections could be expanded to better explain how specific results (e.g., energy levels or size thresholds) were derived and interpreted.</li> <li>3. <b>Parameter Justification:</b> The choice of parameters (e.g., effective mass values) should be explicitly justified, as slight variations can significantly affect the results.</li> <li>4. <b>Experimental Correlation:</b> If experimental data is available, correlating it with the theoretical findings would enhance the practical relevance of the study.</li> <li>5. <b>Discussion Depth:</b> The discussion section could be expanded to include the implications of the findings in the broader context of quantum dot research and development.</li> </ol> <p><b>Overall:</b></p> <p>The manuscript is scientifically correct and provides valuable insights into the confinement regimes of quantum dots. With minor clarifications and enhancements in data presentation and validation, it could stand out as a robust contribution to the field. If further experimental corroboration is provided, the findings would carry even greater impact.</p>	
<p><b>Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.</b></p> <p>:</p>	<p>The references cited in the manuscript cover foundational and relevant studies, providing a good scientific basis for the work. However, the majority of references appear to be from older studies, with only a few from the last decade. Given the rapid advancements in quantum dot research, incorporating more recent references would help to align the manuscript with the latest developments in the field.</p> <p>Evaluation of References:</p> <ol style="list-style-type: none"> <li>1. <b>Coverage of Foundational Work:</b> <ul style="list-style-type: none"> <li>○ Foundational studies, such as Brus (1984, 2007) and Yu &amp; Cardona (2003), are appropriately cited to support the theoretical framework.</li> <li>○ These references are essential for understanding the fundamental principles of quantum confinement and are suitable.</li> </ul> </li> <li>2. <b>Recent Advances:</b> <ul style="list-style-type: none"> <li>○ While there are some recent references (e.g., Harry et al., 2023; Chen et al., 2018), the inclusion of more studies from the last five years would strengthen the manuscript and demonstrate its relevance to ongoing research.</li> </ul> </li> </ol>	

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<p><b>Is the language/English quality of the article suitable for scholarly communications?</b></p>	<p>The language quality of the manuscript is generally adequate for scholarly communication, but it can be improved for clarity, conciseness, and readability.</p>	
<p><b>Optional/General</b>comments</p>	<ol style="list-style-type: none"> <li>1. <b>Relevance to the Field:</b> <ul style="list-style-type: none"> <li>○ The manuscript addresses an important topic in nanotechnology and quantum dot research, making it relevant to the scientific community. The focus on confinement regimes and their applications is timely and significant.</li> </ul> </li> <li>2. <b>Methodology Transparency:</b> <ul style="list-style-type: none"> <li>○ While the theoretical framework is robust, a detailed description of the computational methods or tools used (e.g., software, parameters) would improve replicability and transparency.</li> </ul> </li> <li>3. <b>Potential Impact:</b> <ul style="list-style-type: none"> <li>○ Highlighting how this research contributes to solving existing challenges in quantum dot applications, such as enhancing efficiency in optoelectronic devices, could strengthen the impact statement.</li> </ul> </li> <li>4. <b>Future Directions:</b> <ul style="list-style-type: none"> <li>○ Including a brief discussion on potential future work or unanswered questions in the conclusion could inspire further research and show the broader implications of the study.</li> </ul> </li> </ol>	

**PART 2:**

	<p><b>Reviewer's comment</b></p>	<p><b>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></p>
<p><b>Are there ethical issues in this manuscript?</b></p>	<p><i>(If yes, Kindly please write down the ethical issues here in details)</i></p>	

**Reviewer Details:**

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<p><b>Department, University &amp; Country</b></p>	<p>Al-Razi University, Yemen</p>