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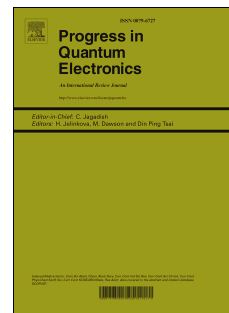
Yue Wang, Handong Sun

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## Advances and prospects of lasers developed from colloidal semiconductor nanostructures

Yue Wang<sup>a,b</sup> and Handong Sun<sup>b,c,d,\*</sup>

<sup>a</sup>School of Materials Science and Engineering, Nanjing University of Science and Technology, Nanjing 210094, P. R. China

<sup>b</sup>Division of Physics and Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore 637371, Singapore

<sup>c</sup>Centre for Disruptive Photonic Technologies (CDPT), Nanyang Technological University, Singapore 637371, Singapore

<sup>d</sup>MajuLab, CNRS-UCA-SU-NUS-NTU International Joint Research Unit, Singapore

\* Email: [hdsun@ntu.edu.sg](mailto:hdsun@ntu.edu.sg)

**Abstract:** Since the first observation of stimulated emission from colloidal quantum dots (CQDs) in year 2000, tremendous progress has been made in developing solution-processed lasers from colloidal semiconductor nanostructures in terms of both understanding the fundamental physics and improving the device performance. In this review paper, we will start with a brief introduction about the fabrication of CQDs and the corresponding electronic structures. The emphasis will be put on the discussion about the optical gain and lasing from colloidal nanostructures including the gain mechanism, the main hurdles against optical gain and lasing as well as strategies to optimize the lasing performance. Afterwards, the recent advances in CQD lasers, exemplified by the achievement of continuous wave lasing, will be presented. Finally, the challenges and a perspective of the future development of lasers based on the colloidal semiconductor nanostructures will be presented.

**Keywords:** Lasers, colloidal semiconductor nanostructures, Auger recombination

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