

Abstract Submitted
for the PSF17 Meeting of
The American Physical Society

Stimulated emission and optical pumping of lasing from ZnO nanostructures: effect of morphology and surface treatment.¹ KETAKI SARKAR, Univ of Illinois - Chicago, RICHARD D SCHALLER, Argonne National Laboratory, MICHAEL A STROSCIO, MITRA DUTTA, Univ of Illinois - Chicago — Optical probing of ZnO nanostructures elucidates many insightful knowledges of the carrier dynamics and recombination mechanisms. Morphology and surface conditions of these nanostructures have strong role to play in the surface mediated demeanor of the excited carriers. As the size of nanostructures decreases from the bulk, the surface to volume ratio increases thereby introducing traps, surface states and other scattering processes. Due to this sensitivity of structural factors and concentration of the defects, it is decisive to study the evolution of the emission properties as a function of the morphology and any kind of surface treatment. In this work is discussed how surface morphology and improved surface quality has to do with the transition from spontaneous emission to stimulated emission under high photo-excitation. Lasing from ZnO ribbons by optical pumping has also been studied. The effect of surface treatment on the threshold and lasing efficiency has been particularly highlighted. The underlying mechanism of the transition from spontaneous to stimulated emission and finally lasing has also been analyzed.

¹The work at UIC was partially supported by Grant No. FA9550-15-1-0493 from the Air Force Office of Scientific Research. Use of the Center for Nanoscale Materials, was supported by the U.S. Department of Energy, under Contract No. DE-AC02-06CH11357.

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Date submitted: 23 Oct 2017

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