

LASER EFFECT ON LINEAR AND NONLINEAR OPTICAL PROPERTIES OF INGAN MULTIPLE QW



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Objectives – Context

There has been an increasing interest in the investigation of LDS semiconductor heterostructures due to their intrinsic physical properties and technological applications in electronic devices. Electrical and optical properties of wide bandgap group-III nitride-based LDS semiconductors with the effect of a laser field are the axis of research group.

Model, Method & Approach

- The Hamiltonian of the system in the effective unities:

$$H = \frac{p^2}{2m^*} + V(x) - \frac{2}{(x - x_0)^2 + (y - y_0)^2 + (z - z_0)^2}$$

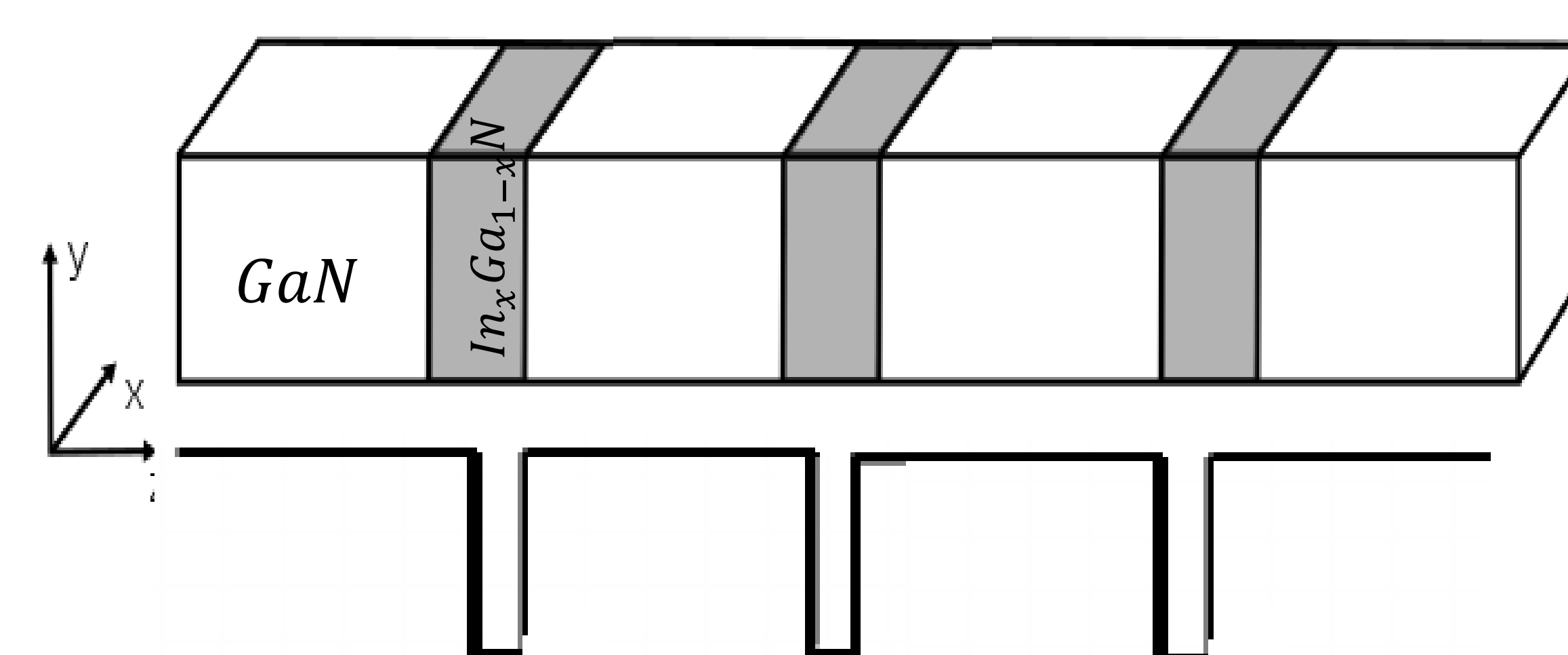
- The finite elements method :

FEM is a systematic way to convert the functions in an infinite dimensional function space to first functions in a finite dimensional function space and then finally ordinary vectors (transform partial differential equation into algebraic equations) that are tractable with numerical methods.

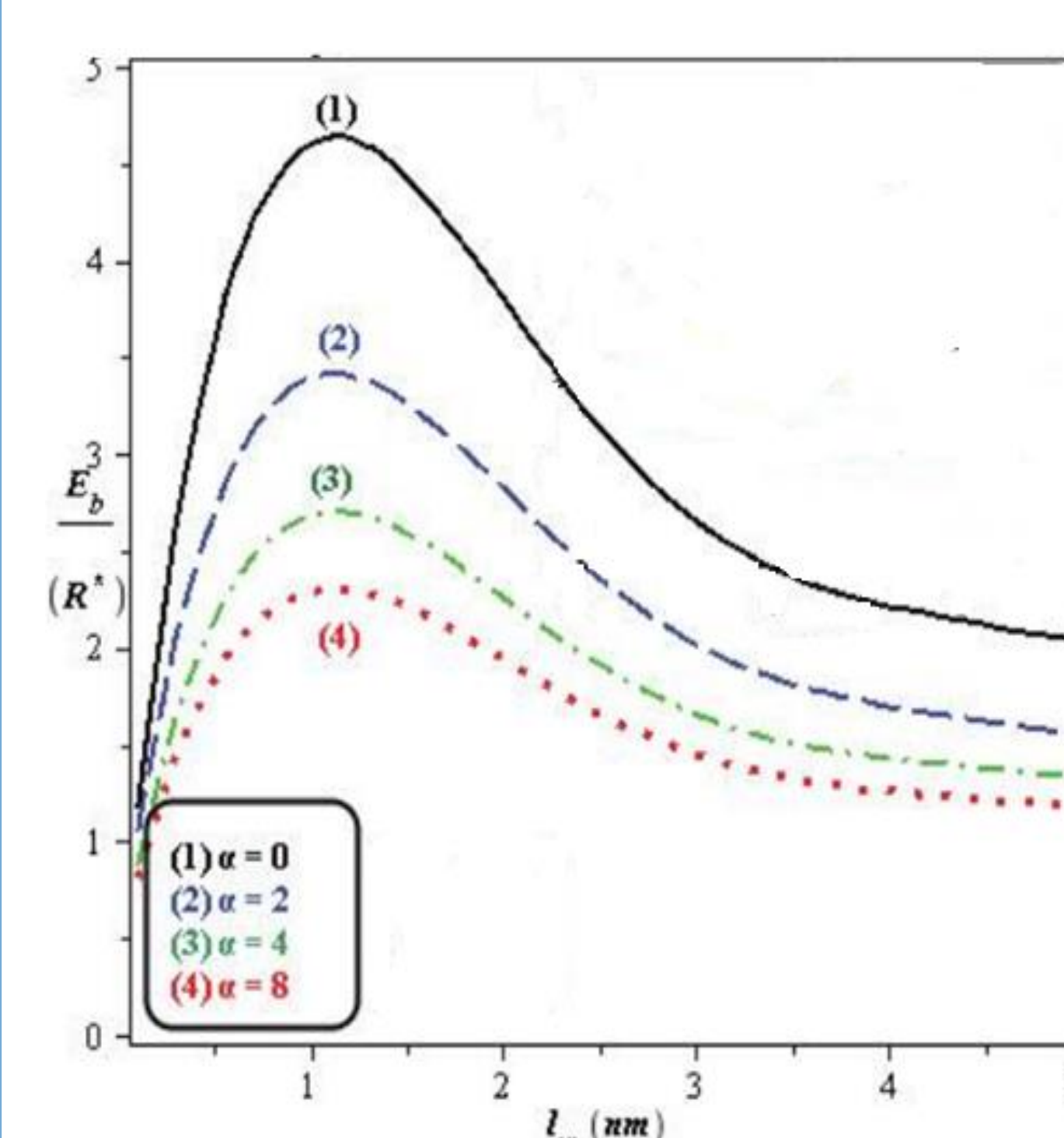
- Python :

Python is an interpreted high-level programming language for general-purpose programming. With the right code, the Python programming language do all the numerical linear algebra.

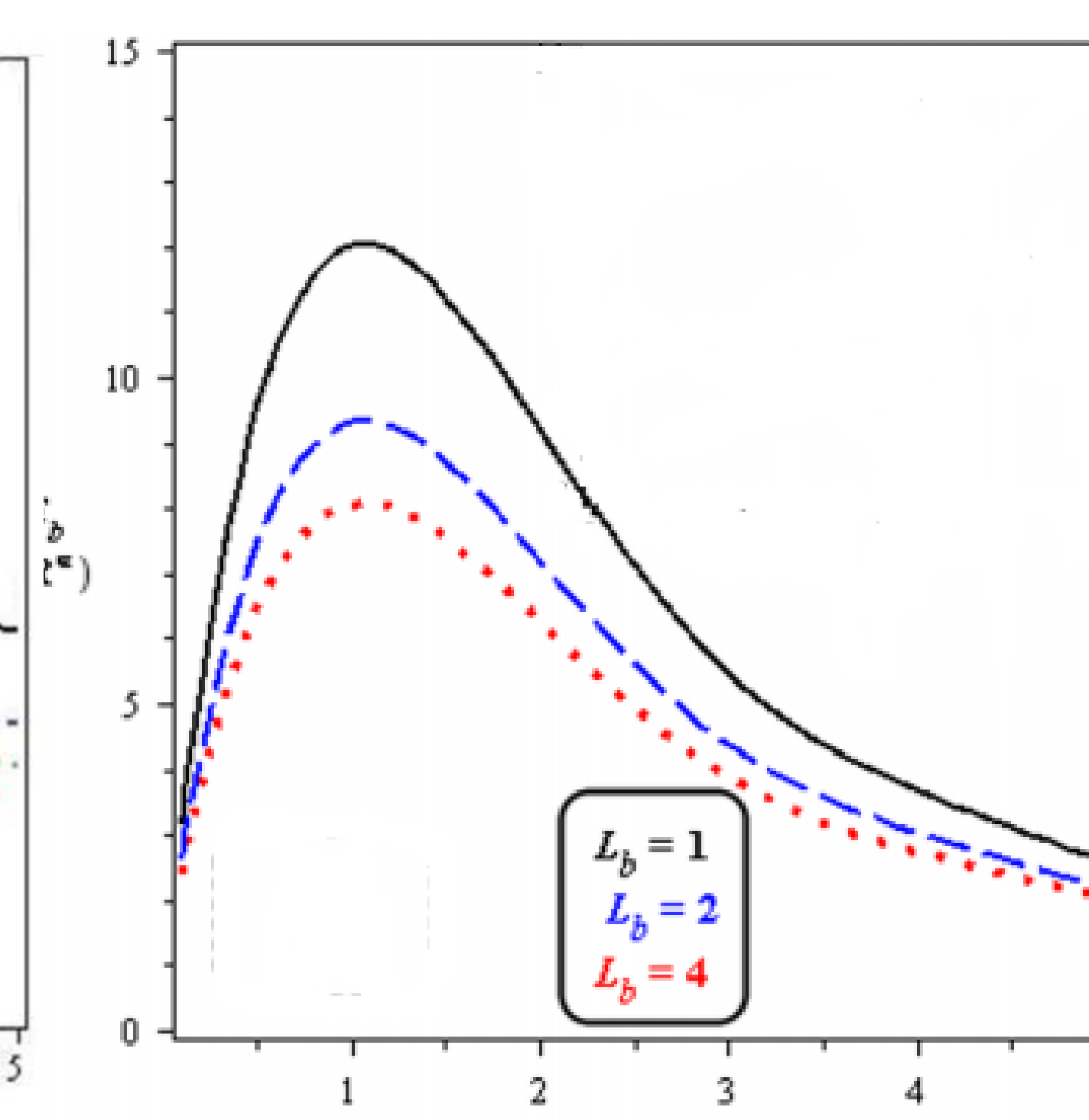
Important results



Schematic representation of the multiple quantum well (In,Ga)N



The ground state shallow-donor binding energy of (In, Ga)N QW versus the well width. The effect of the ILF is included.



The on-center ($z_0 = 0$) hydrogenic impurity ground-state binding energy in (In,Ga)N QW as a function of the width.

Conclusion and Perspectives

- We have shown the effect of size on the ground state shallow-donor binding energy of (In, Ga)N QW .
- We have shown the laser effect on The on-center hydrogenic impurity ground-state binding energy in (In,Ga)N QW.
- Our perspectives is investigating laser effect on the Optical properties for our structure,

Acknowledgment