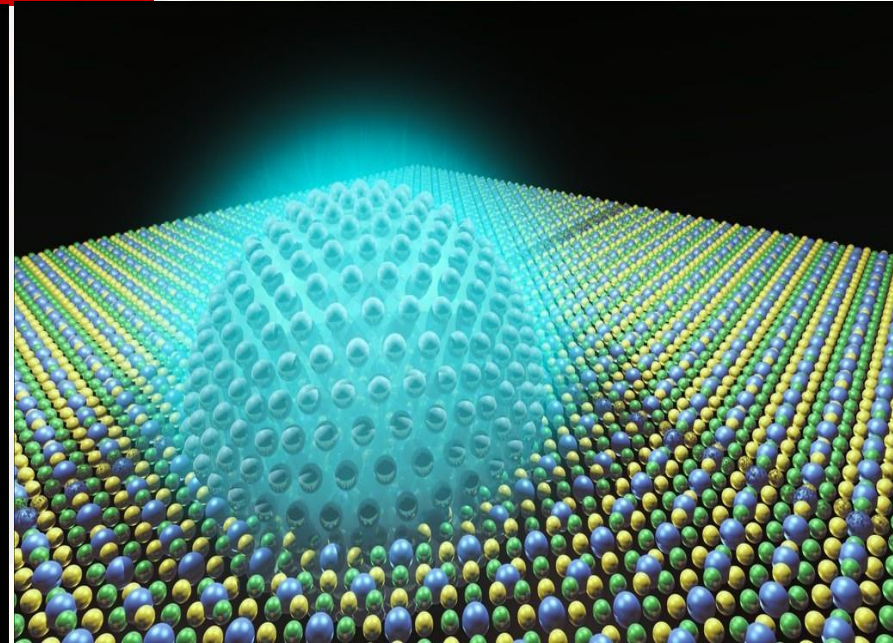
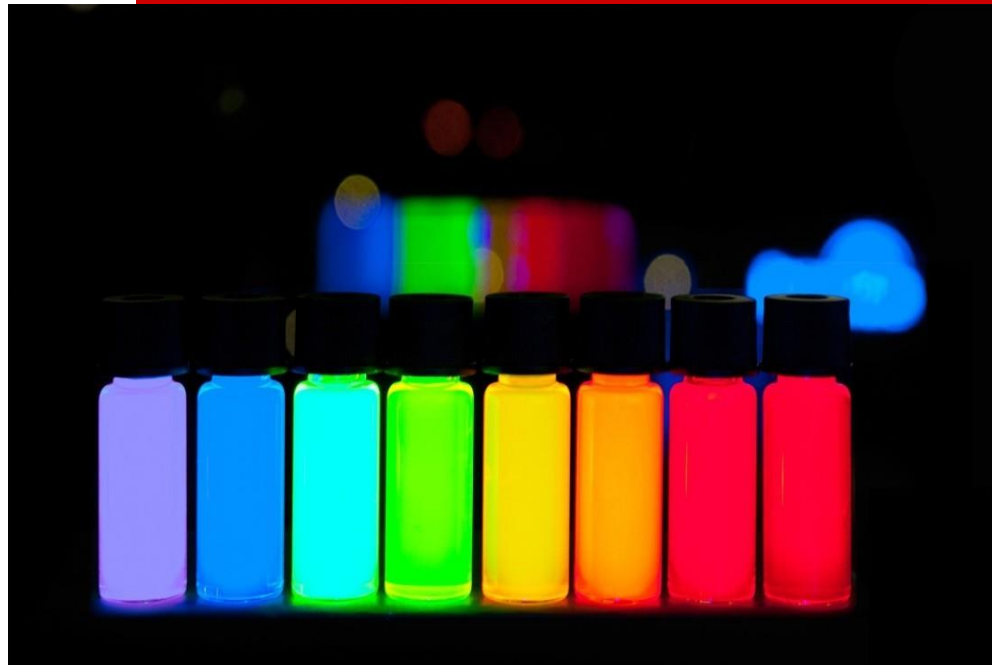




# UNIT IV



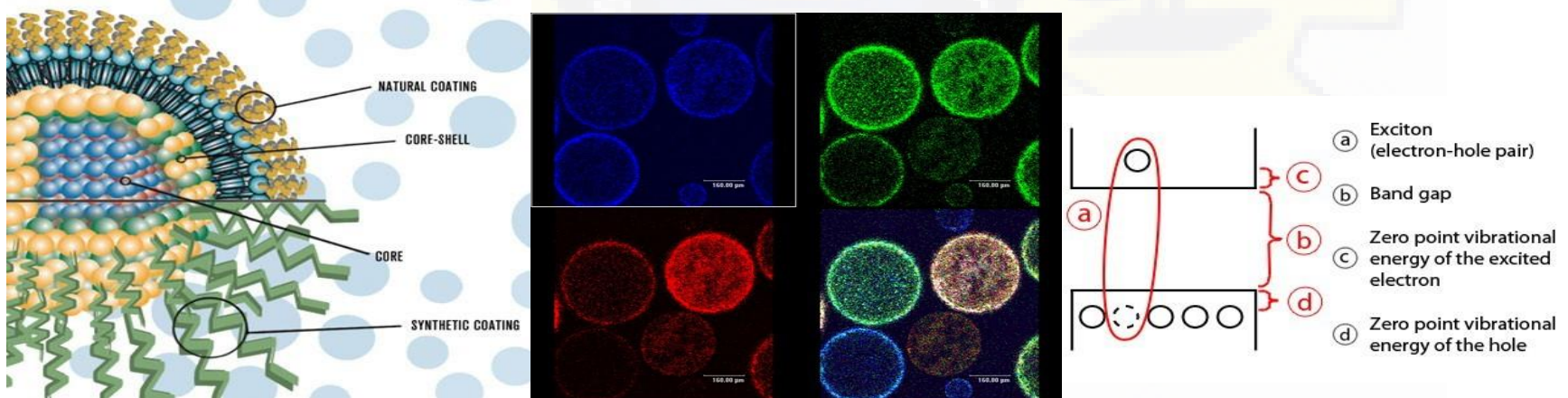
## Quantum Dot LED



# INTRODUCTION

A **QUANTUM DOT** is a Nano crystal made of semiconductor materials that are small enough to exhibit quantum mechanical properties.

Researchers have studied applications for quantum dots in transistors, solar cells, LEDs, and diode lasers.

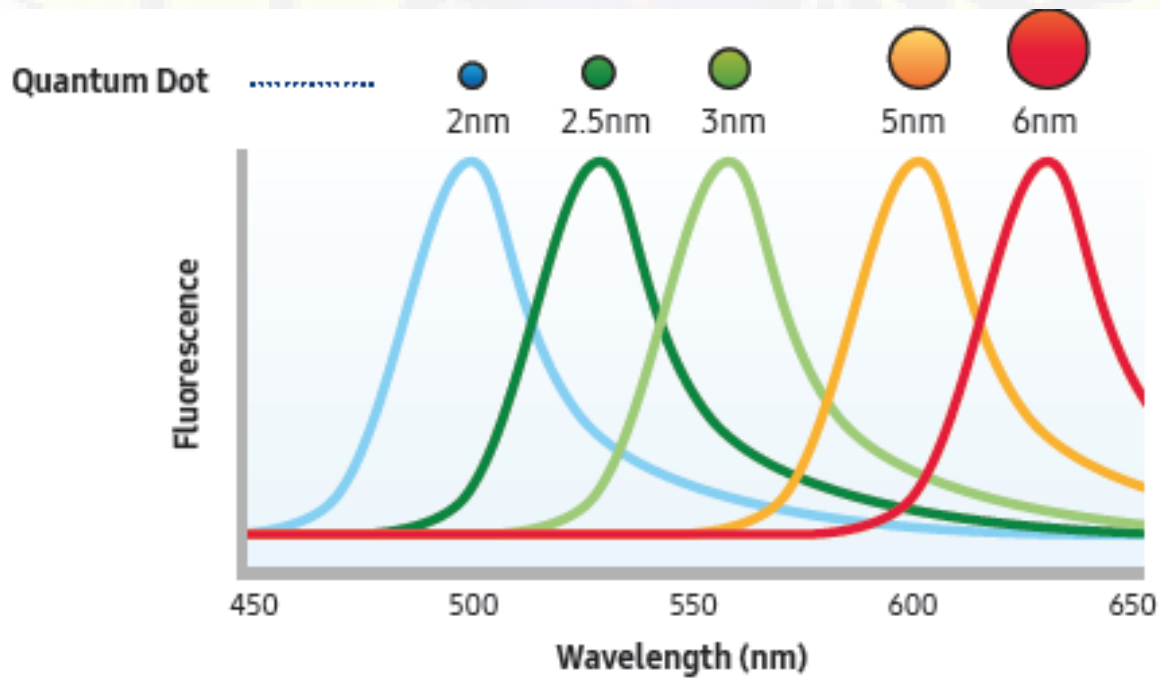




- WHAT IS QUANTUM DOT TECHNOLOGY?
- What are Quantum dots?
- Quantum dots are semi-conductor nanocrystals that are able to absorb higher-energy light and
- convert it to lower-energy light. The light wavelength — or color — that quantum dots emit varies
- depending on their size. For example, the smallest dots, with a diameter of just 2nm, emit blue
- light. The largest particles, with a diameter of around 6nm, emit red light.

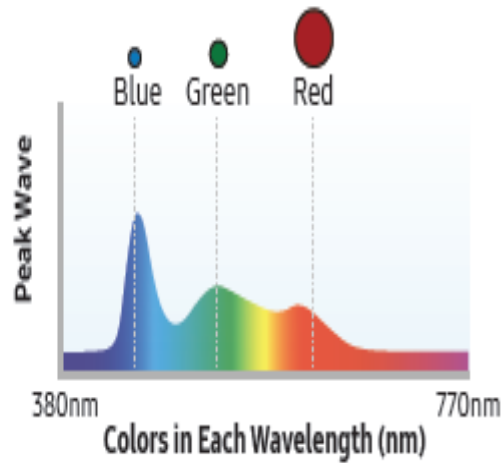


- The colors quantum dots emit are extremely pure and highly saturated. That is because they produce
- higher spectral wave peaks than conventional materials, which result in a wider range of
- colors, especially reds and greens, that are clearer, more accurate, and truer to life. Quantum dots
- are also highly efficient at converting light, so using the same amount of electrical power they are
- able to generate brighter colors than other materials.



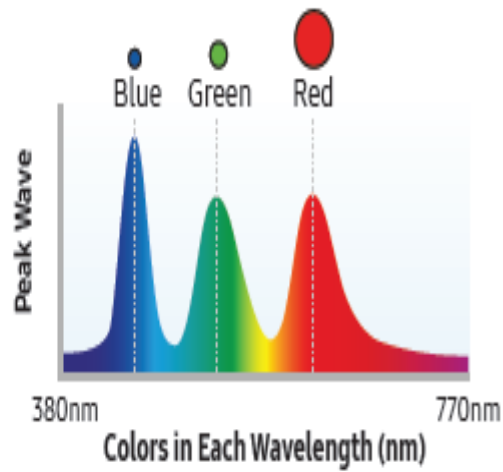


Samsung  
Conventional



Red, Green, Blue  
expressed by  
Conventional Monitors

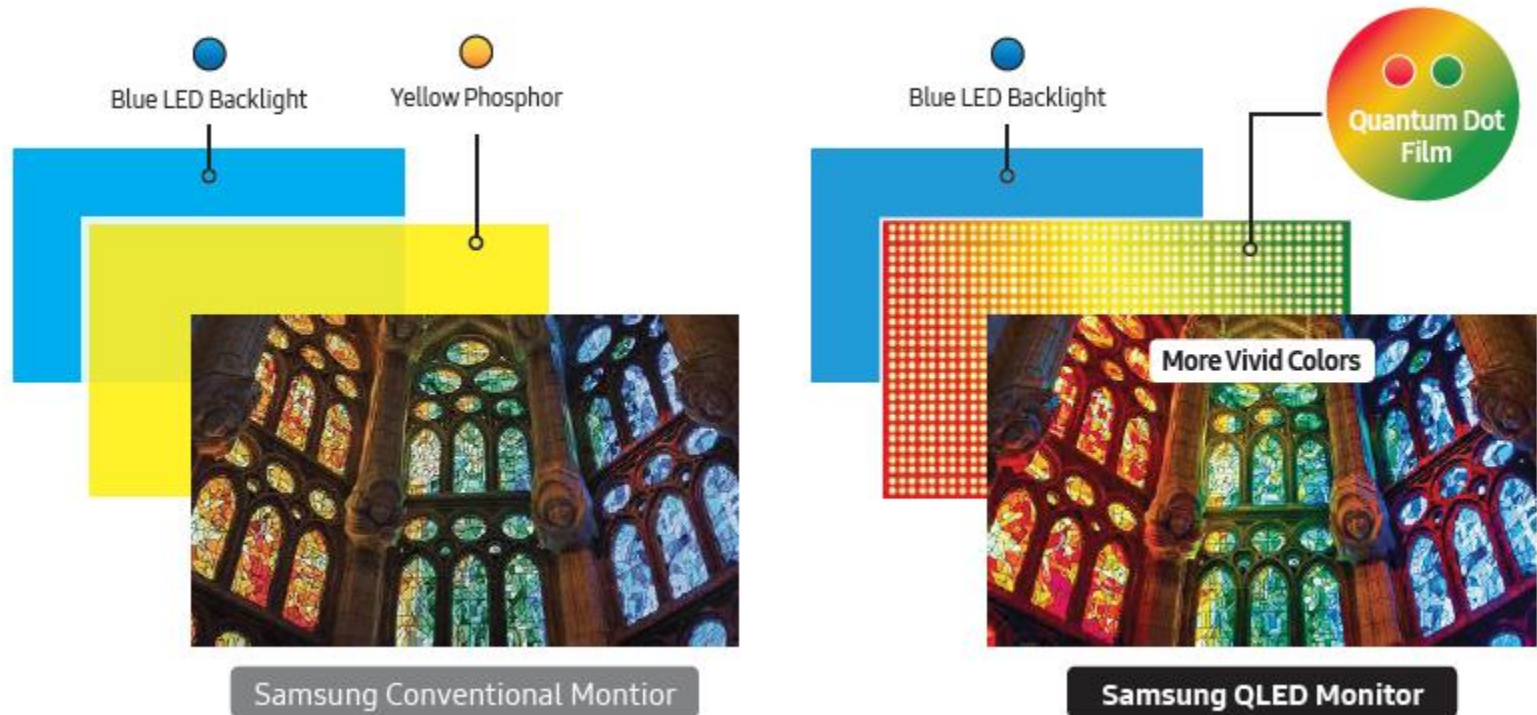
Samsung  
Quantum Dot



Pure Red, Green, Blue  
expressed by  
Samsung QLED Monitors



# How is Quantum dot applied to monitors?





For Movies



Samsung Conventional Monitor



Samsung QLED Monitor

For Games

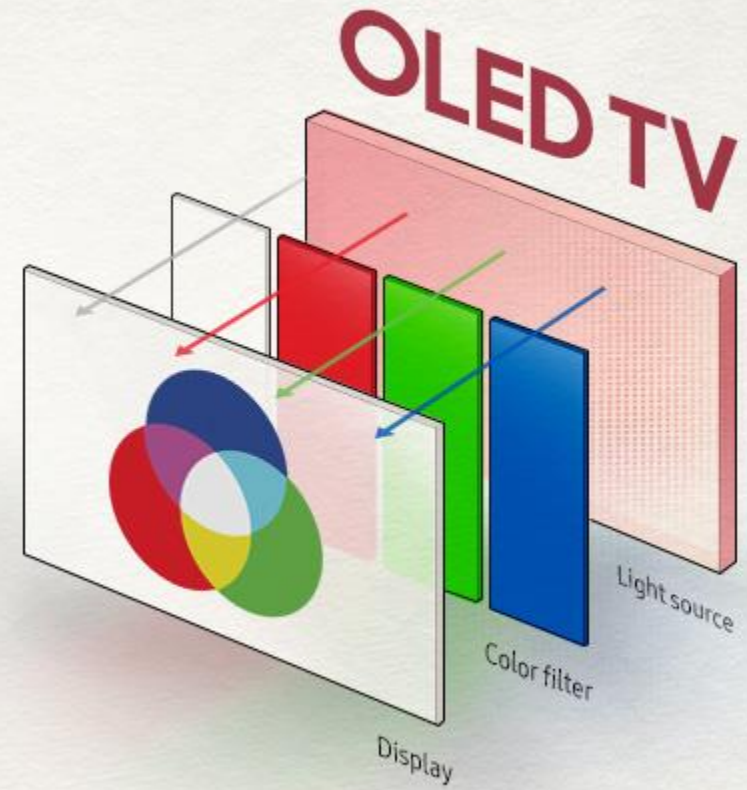
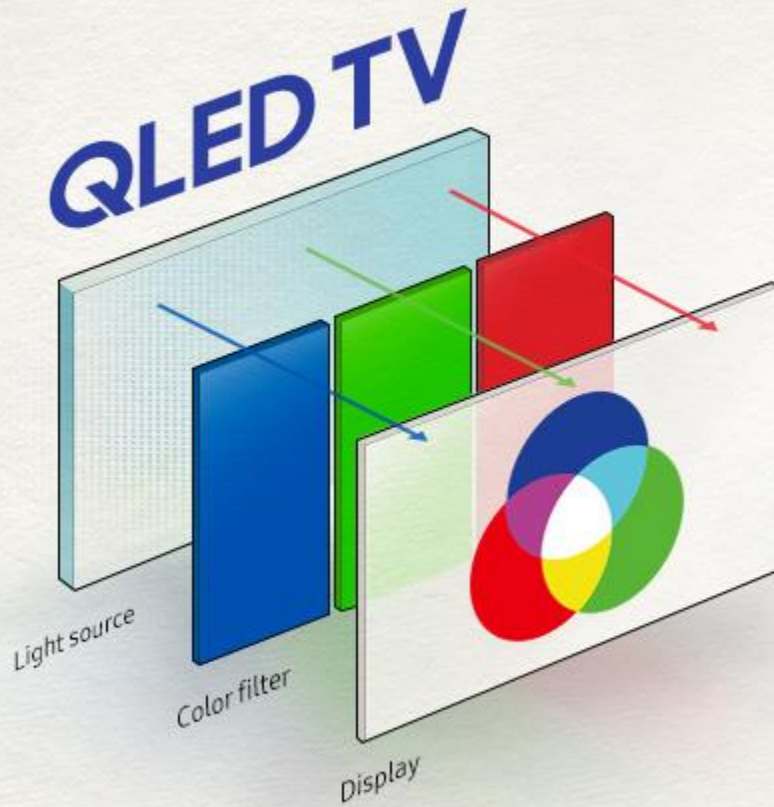


Samsung Conventional Monitor



Samsung QLED Monitor



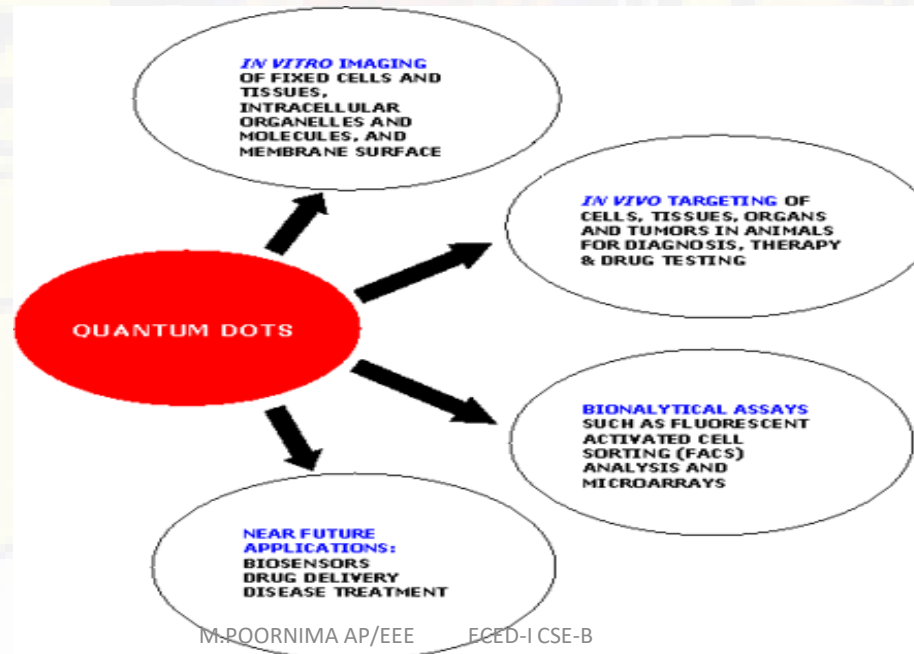




# APPLICATIONS

## Computing:-

Quantum dot technology is one of the most promising candidates for use in solid-state quantum computation. With several entangled quantum dots, or qubits, plus a way of performing operations, quantum calculations and the computers that would perform them might be possible.

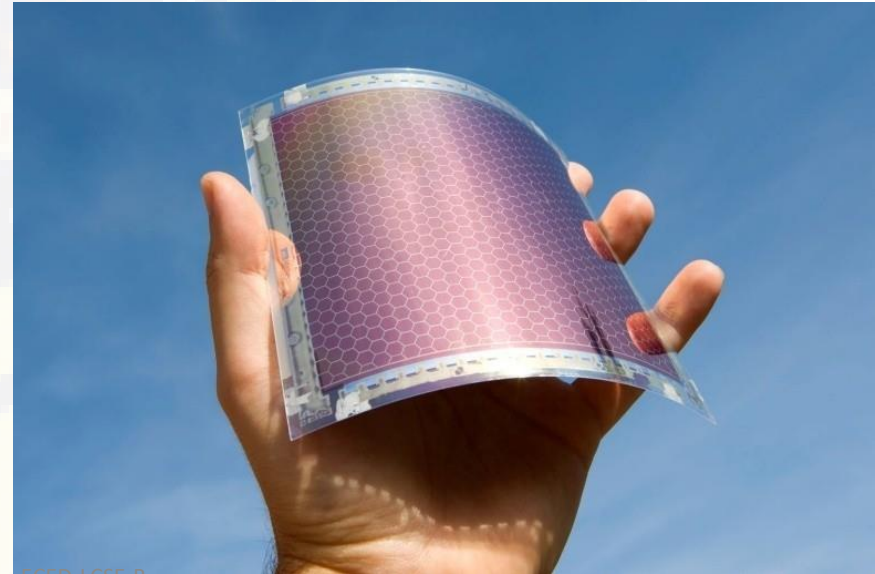
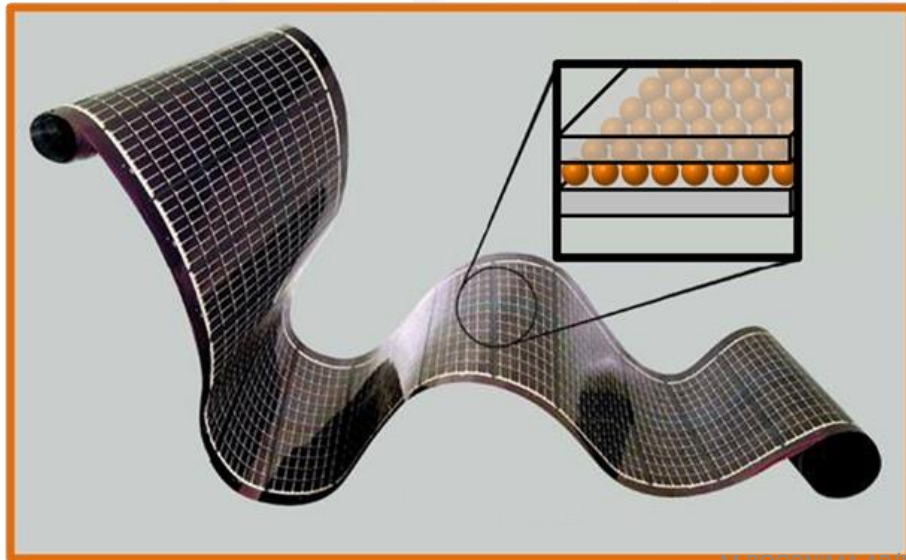




# APPLICATIONS

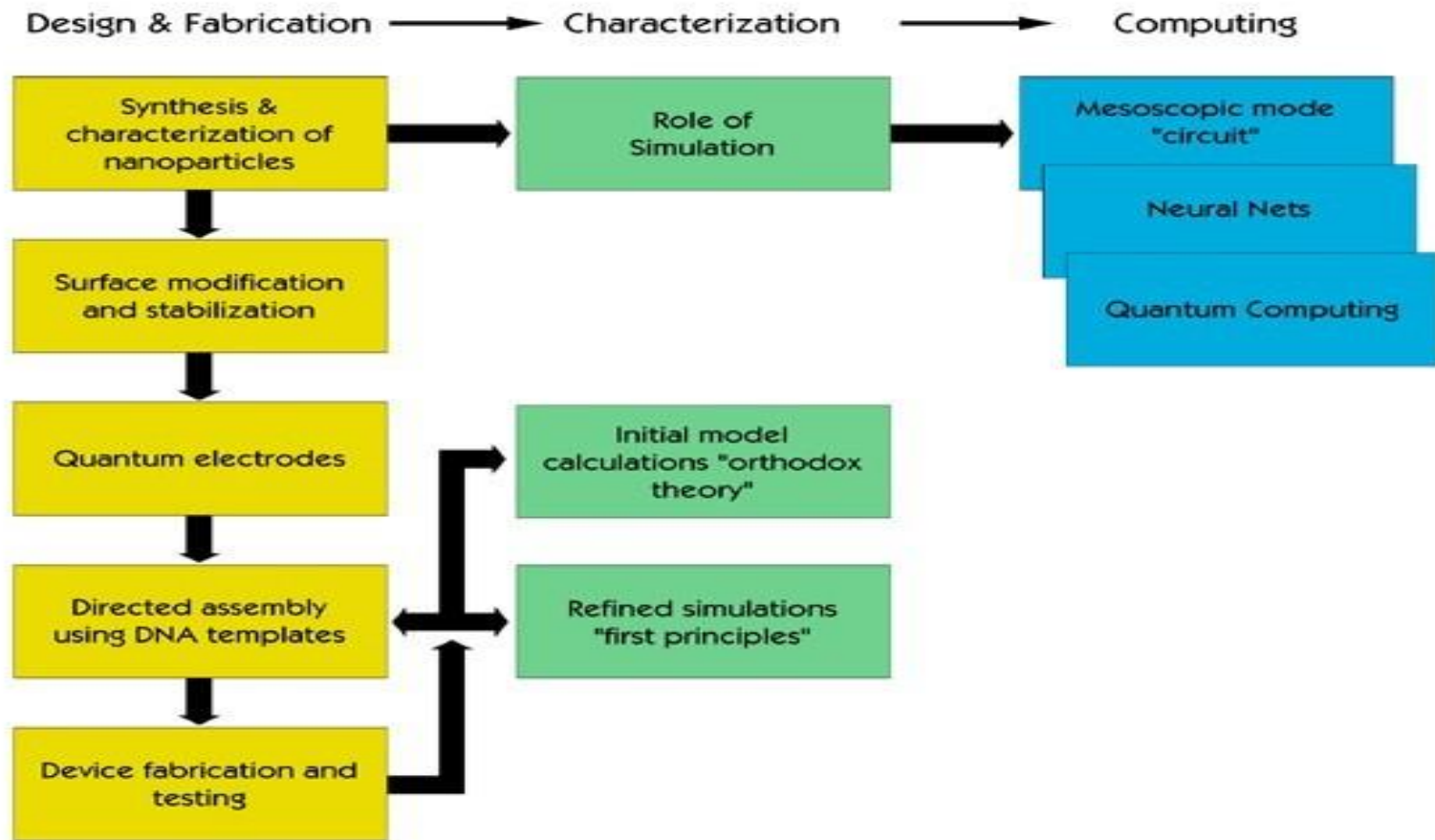
## Photovoltaic Devices:-

Quantum dots may be able to increase the efficiency and reduce the cost of today's typical silicon photovoltaic cells. . Quantum dot photovoltaic would theoretically be cheaper to manufacture, as they can be made "using simple chemical reactions."





# IMPLEMENTATION



**Fig:-Implementation of Quantum dots in Quantum Computing**



## CONCLUSION

- QUANTUM DOTS is a Nano crystal made of semiconductor materials that are small enough to exhibit quantum mechanical properties.
- There are several ways to confine excitons in semiconductors, resulting in different methods to produce quantum dots.
- Research effort around the world is being applied to expanding the accuracy and capabilities of this Nano Particles for its usage in the industry of Hardware Components and Electronics as it is one of the most promising candidates for use in solid-state quantum computation.
- Quantum dots have also been suggested as implementations of qubits for Quantum Information Processing.



# FUTURE WORKS

- Several Research works are now focussing on the application of Quantum Dots in the hardware structure of Micro-Computers, Integrated Circuits, Silicon Chips and methods that preserves the unit necessary to power lightning fast viable Computers known that uses Hole spin rather than electron spin that keeps the quantum bits in same physical state up to 10 times longer than before.

