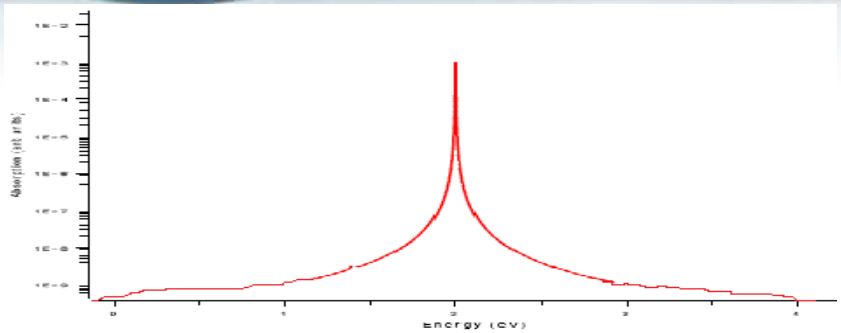
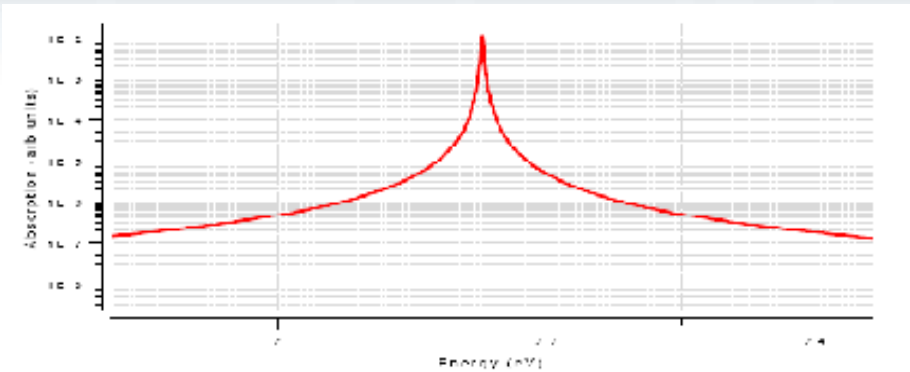
Development of a Rappture-based Generic Parallel Optimization Engine



Target optical absorp. Plot with resonance at 2 eV



Optimizer gives most fit Qdot parameters as x_{length}=5nm, y_{length}=13.5 nm, z_{length}=6.5nm, E_f = 0, T = 300K and resonance at 2.15 eV.

Objective

- To build a Generic Parallel Optimization Engine within the Rappture framework.
- Enable automatic optimization for all Rappture-based nanoHUB.org tools

Approach

- Use existing software (PGAPack) for basic GA framework.
- Modify Rappture framework to include optimization API.
- Use API to make Rappture talk to PGAPack.

Result

- Demonstrated sequential optimization of an absorption line in Quantum Dot Lab.
- Parallelization of GA enables solving sequentially intractable problems in orders of magnitude lesser time.

Desired Impact

- First **generic parallel** optimization package with **programmable fitness functions**.
- Plug-in any tool into the Rappture framework to solve optimization problems on the nanoHUB.

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