UITF update

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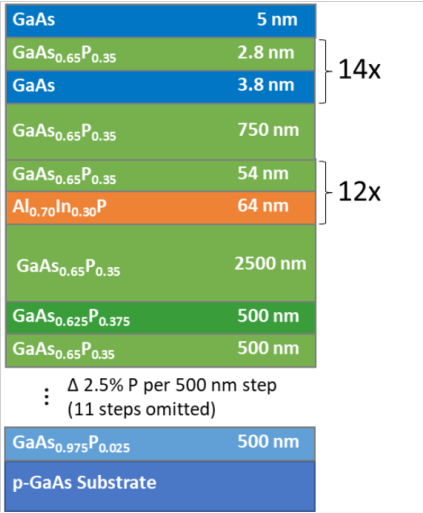
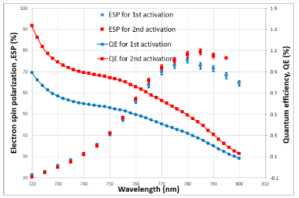
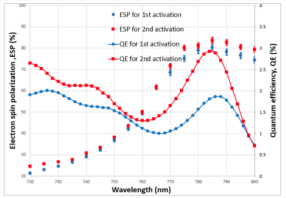
ODU results



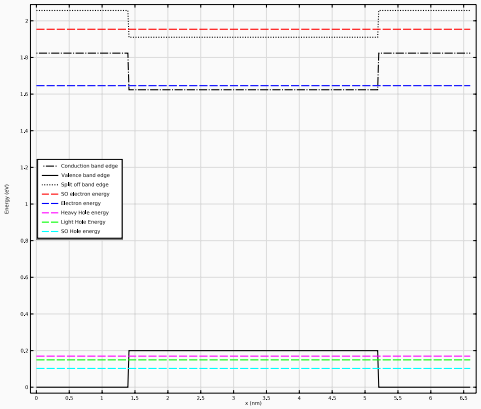




Material	Growth Process	Reference	Year	P(%)	QE(%)	Figure of merit (P^2QE)
GaAs-$GaAs_{0.64}P_{0.36}$	MOCVD	Nagoya [15]	2001	90	0.4	0.32
GaAs-$GaAs_{0.64}P_{0.36}$	MBE	Maruyama [16]	2004	86	1.2	0.89
GaAs-$GaAs_{0.62}P_{0.38}$	MBE	Jin [17]	2014	92	1.6	1.35
GaAs-$GaAs_{0.65}P_{0.35}$	MBE	Liu [2]	2016	84	6.4	4.52
GaAs-$GaAs_{0.65}P_{0.35}$	MOCVD	This Work	2022	82	2.9	1.95

COMSOL Simulation - Quantum Confinement Effects

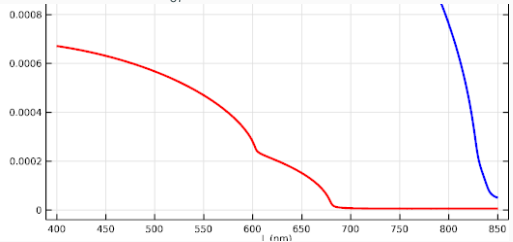
Using COMSOL to look at effects to the band gap energies due to Quantum confinement



$$\epsilon(E) = 1 + \eta[\pi(\chi_h) + \pi(\chi_l) + \pi(\chi_{so})]$$

$$\pi(\chi_i) = \frac{1}{m_i^2 E_{0i}^{3/2}} \left(\frac{1}{\chi_i}\right)^2 [2 - 2(1-\chi_i)^{1/2} - (1+\chi_i)^{1/2}]$$

$$\chi_i = \frac{E + i\Gamma}{E_{0i}}, k \sim \epsilon, \alpha(\lambda) = \frac{4\pi k}{\lambda}$$



Jefferson Lab

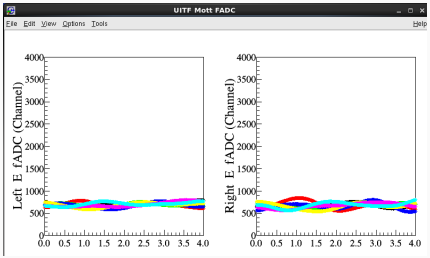
UITF/ion bombardment

Goals:

1. Polarization, QE, and lifetime studies for high QE photocathode in UITF
2. Variable wavelength scans
3. High power laser for high current studies
4. Gas speciation for ion back bombardment
5. Gun HV scans for ion damage

Requirements

- HV Gun, Spin manipulation, Mott Polarimeter (see below), residual gas alteration method



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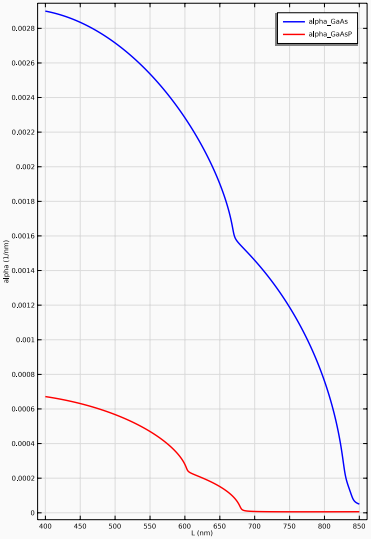
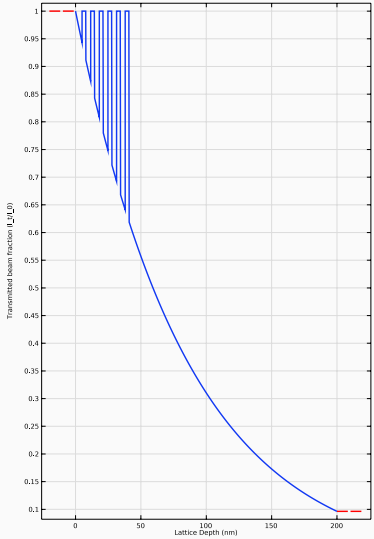
COMSOL Results +





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