Low-Temperature-Grown MBE GaAs

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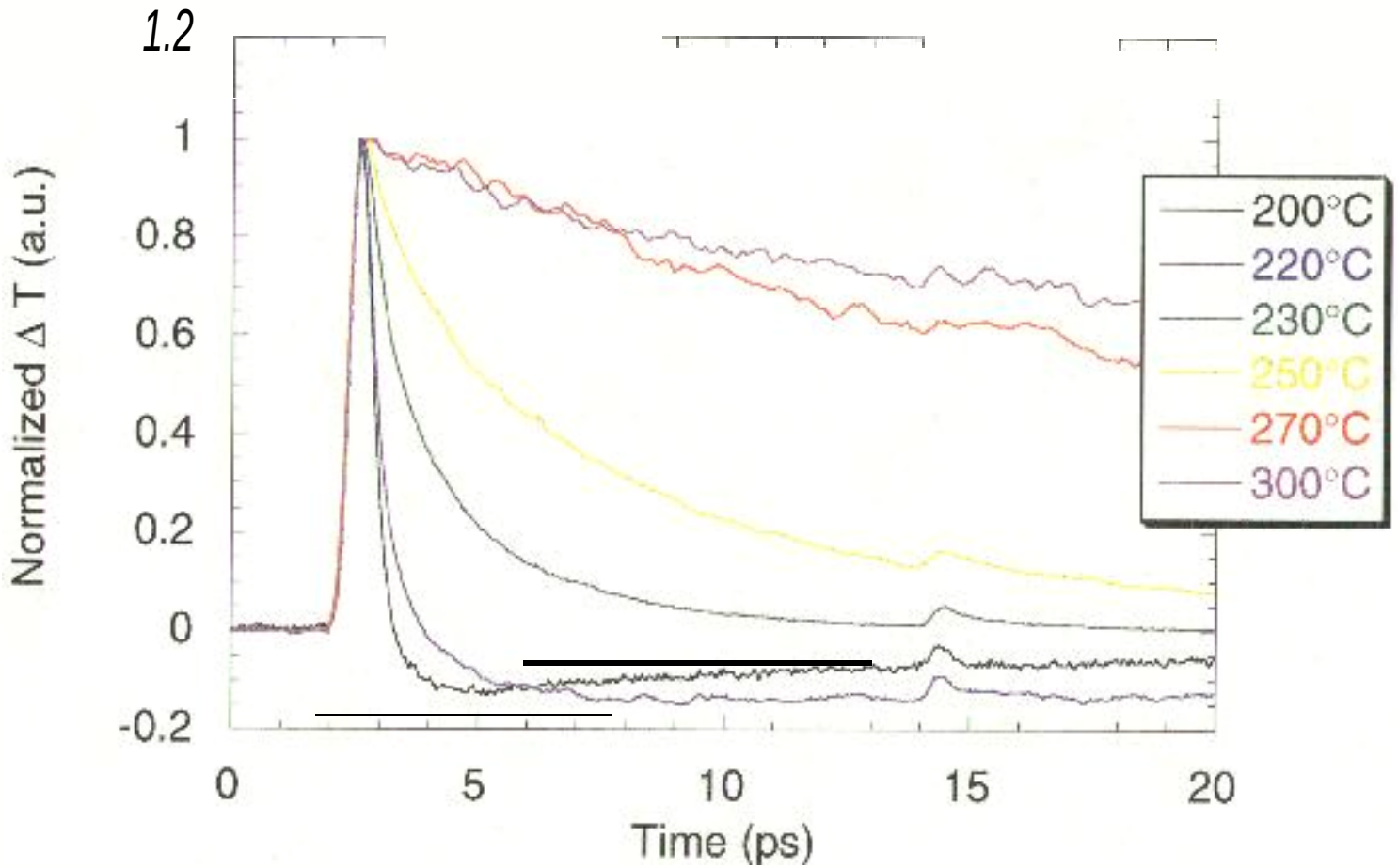
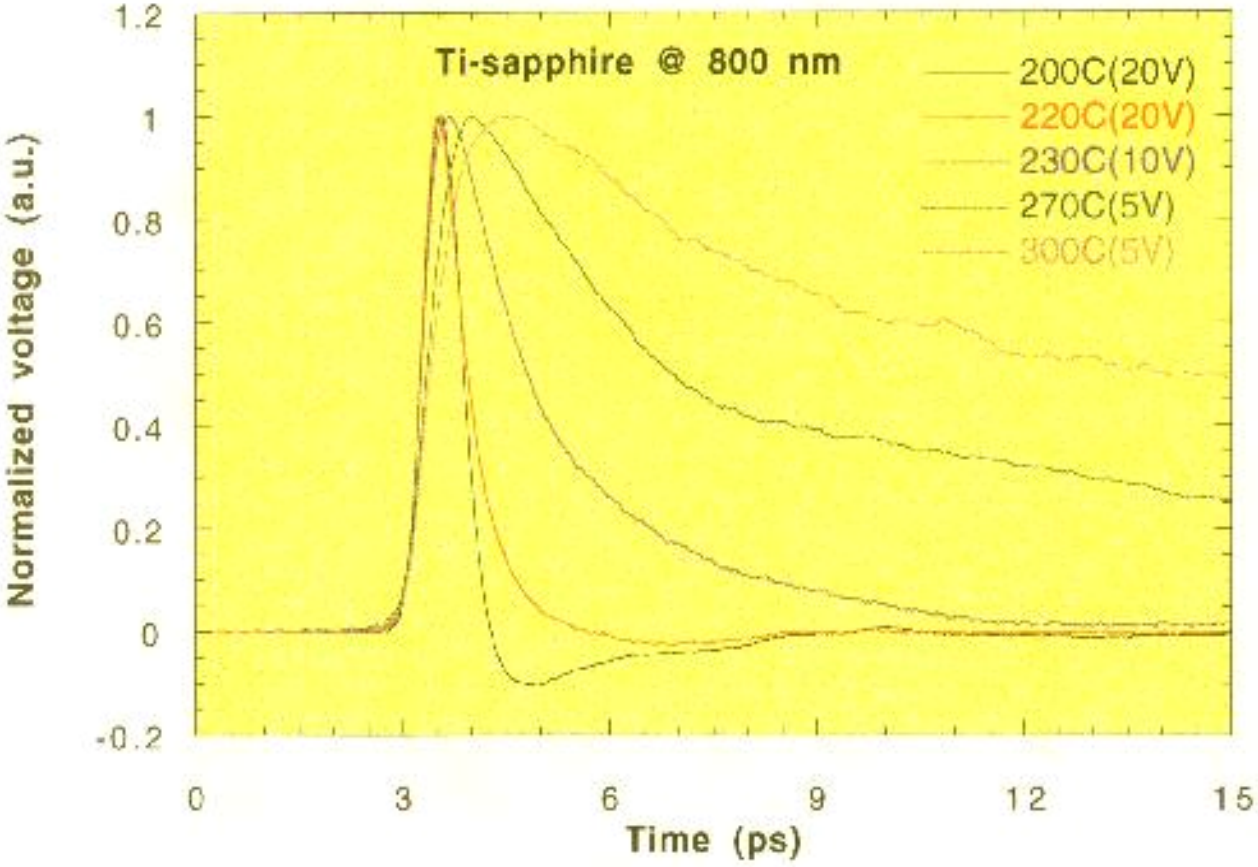
LT-GaAs Properties

	As-grown (~ 200°C)	Post-annealed (600°C/10min)
Excess As	10^{19} - 10^{20} cm^{-3}	As precipitates formed (10^{17} - 10^{18} cm^{-3})
Crystal Quality	Lots of defects (AsGa, V_{Ga}, interstitials, etc.)	Single crystal like
Dark resistivity	Low (~10^4 - 10^5 Ω•cm)	High (~10^6 - 10^7 Ω•cm)
Mobility	Low (~10^2 $cm^2/V•s$)	High (~10^3 $cm^2/V•s$)
Hopping Conduction at room temperature	Significant	Not significant
Photoexcited Carrier Lifetime	Ultrafast (~0.4 - 0.6 ps)	Ultrafast (~ 0.4 - 0.6 ps)
Applications	None reported	Ultrafast detectors,pulse generators sampling gates, photomixers, etc.

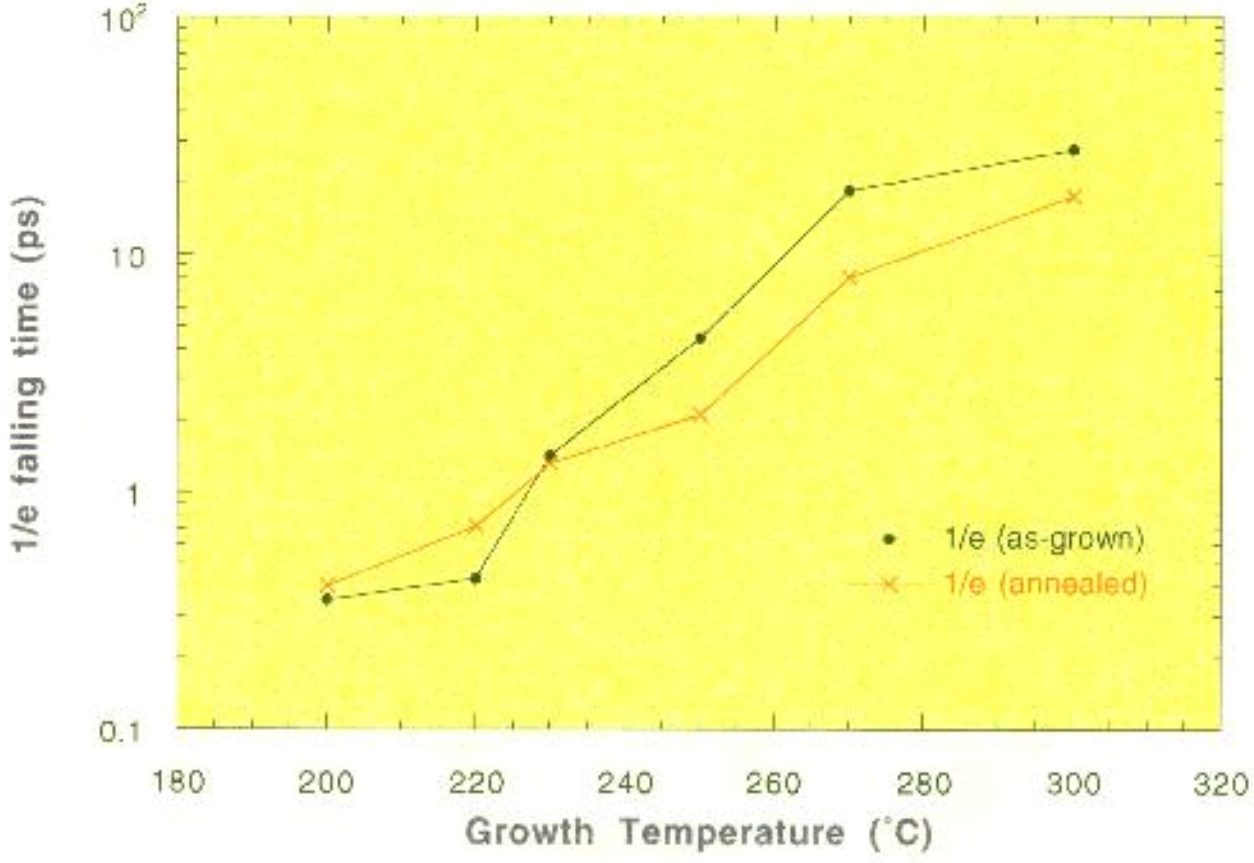
Transient Transmission Measurement of As-Grown LT-GaAs vs. Growth Temperature



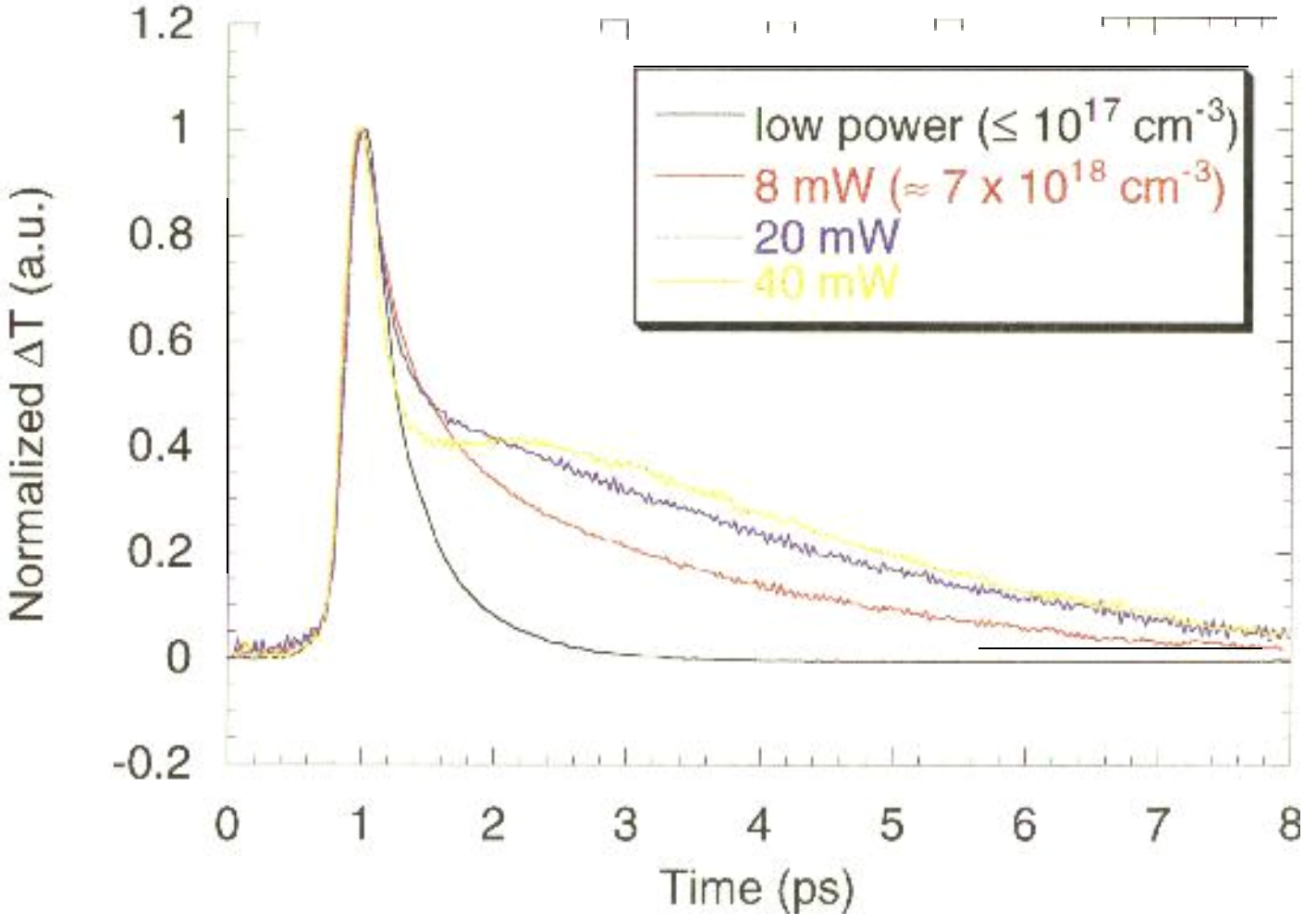
Photoconductive Switch of Annealed LT-GaAs with Different Growth Temperatur



Carrier Lifetime characterized by Transmission Pump-Probe vs. Growth Temperature



Conduction Band Saturation Effects for Annealed LT-GaAs Tg=210 C



Electron-Trap Saturation: Data and Fitting