

The logo for FAST (Fast Advanced Scintillator Timing) features the word "FAST" in a bold, sans-serif font. Each letter is filled with a different color: 'F' is blue, 'A' is purple, 'S' is pink, and 'T' is orange. The letters have a slight 3D effect with a shadow.

Fast Advanced
Scintillator Timing
(2014-2018)



WG2: Status of activities IP Prague – 6/2018

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An analogous situation exists in 1D-confined multiple quantum well (MQW) nanostructures

Up to 70 MQW, total thickness exceeded 1 μm !

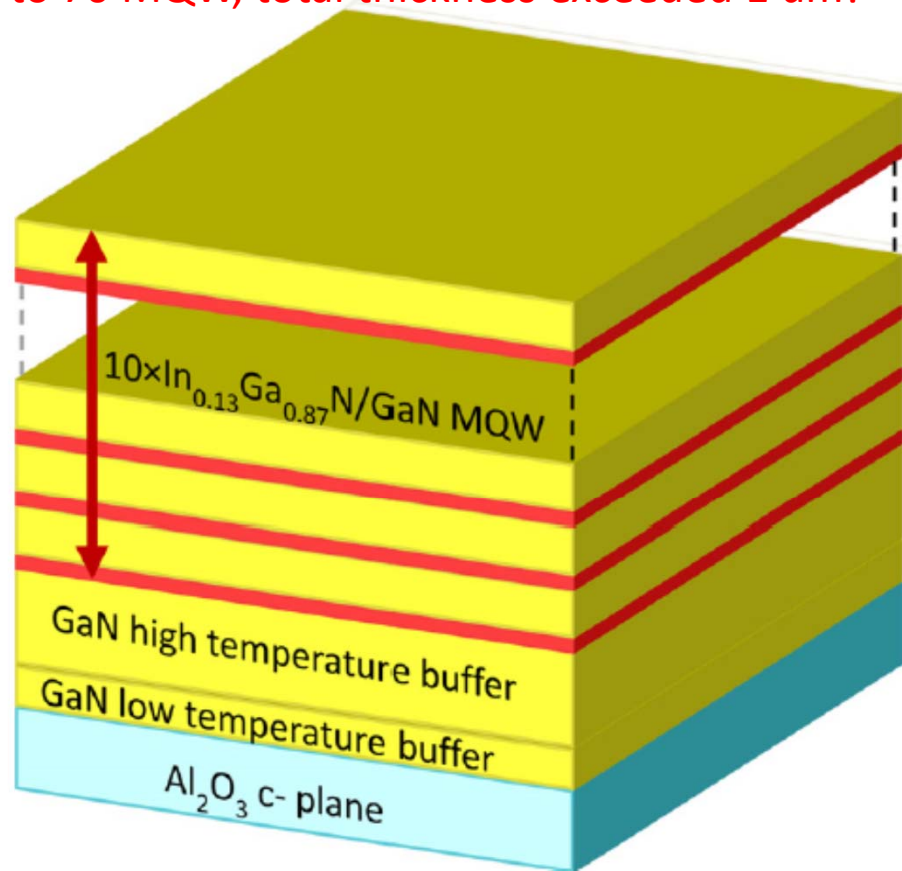
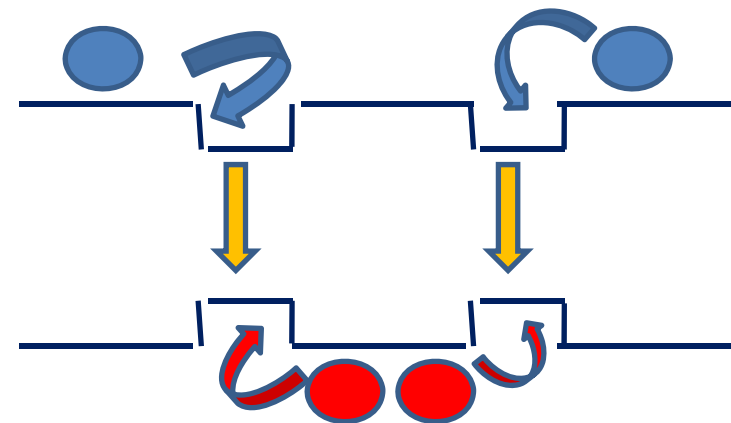


Figure 1. A schematic drawing of the multiple quantum well structure.

Hospodkova et al, *Nanotechnology* **25**, 455501 (2014).

Hubacek et al, *Wed*, 9.45



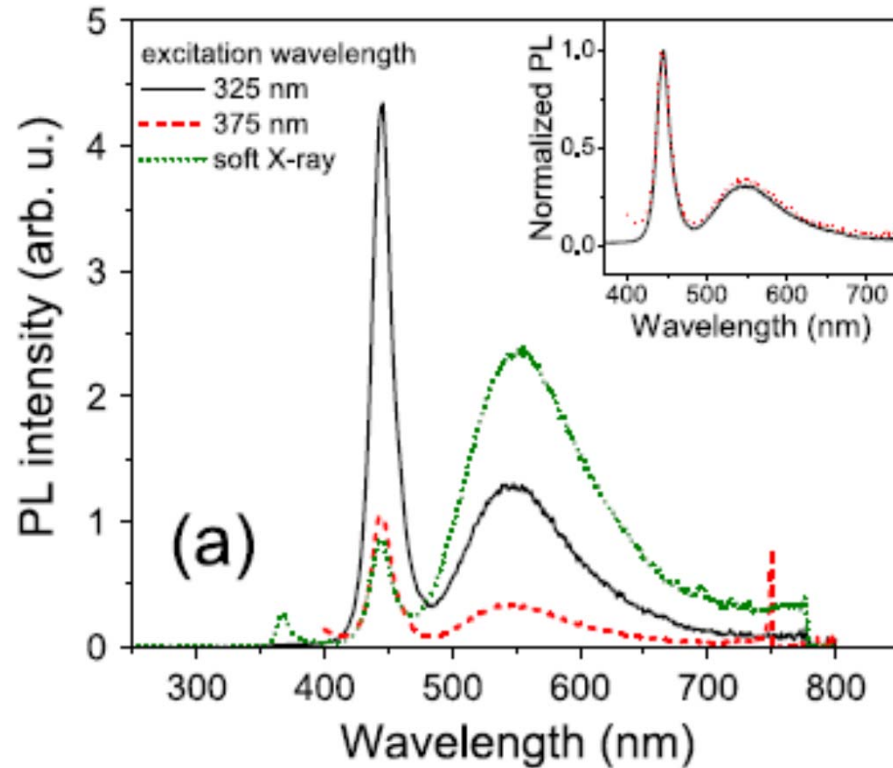
Electrons and holes are concentrated in narrow gap layers and radiatively recombine there being spatially confined by small thickness (few nm) of the layer MOVPE technology can prepare such nanostructures on 4-6 inch size Al_2O_3 substrates

Spectral characteristics of GaN-GaN MQW

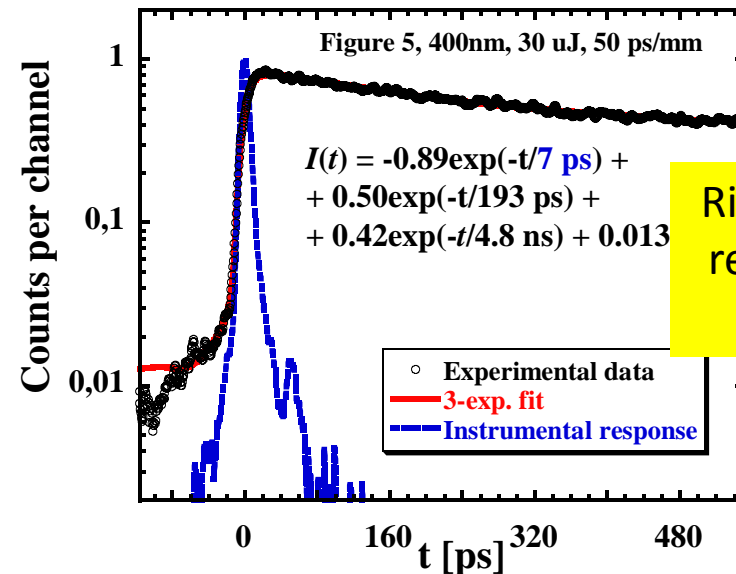
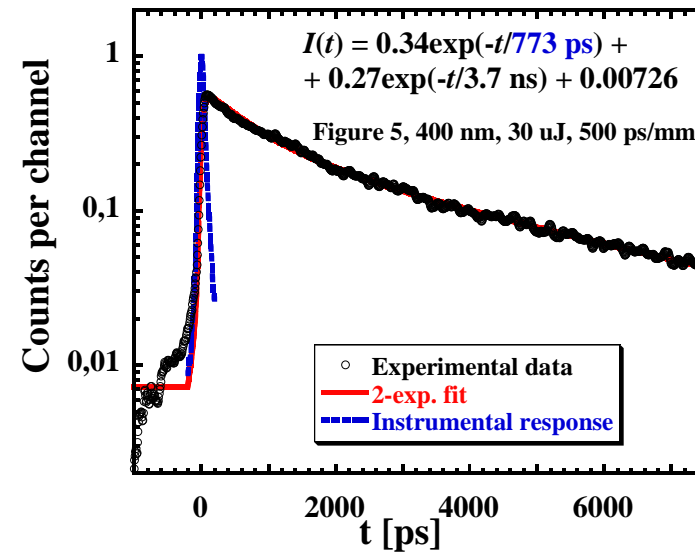
Photoluminescence decay

(made@CNR Pisa, L. Gizzi&G. Toci)

Luminescence spectra



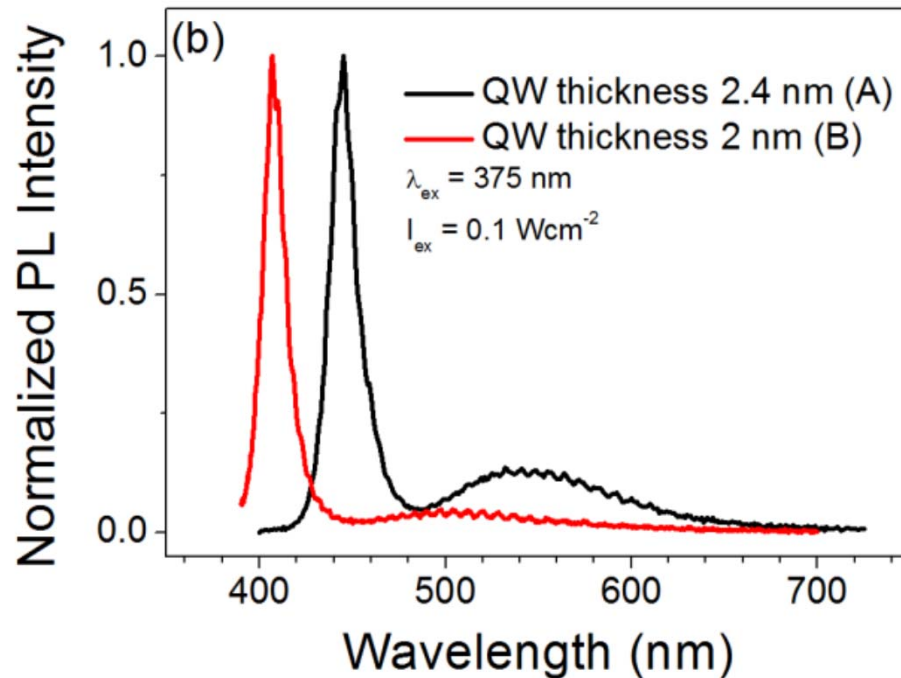
The problem is slow defect-based emission band in yellow spectral region. Optimization of MQW shape and composition can bring PL 1/e decay time down to about 1 ns preserving high QE.



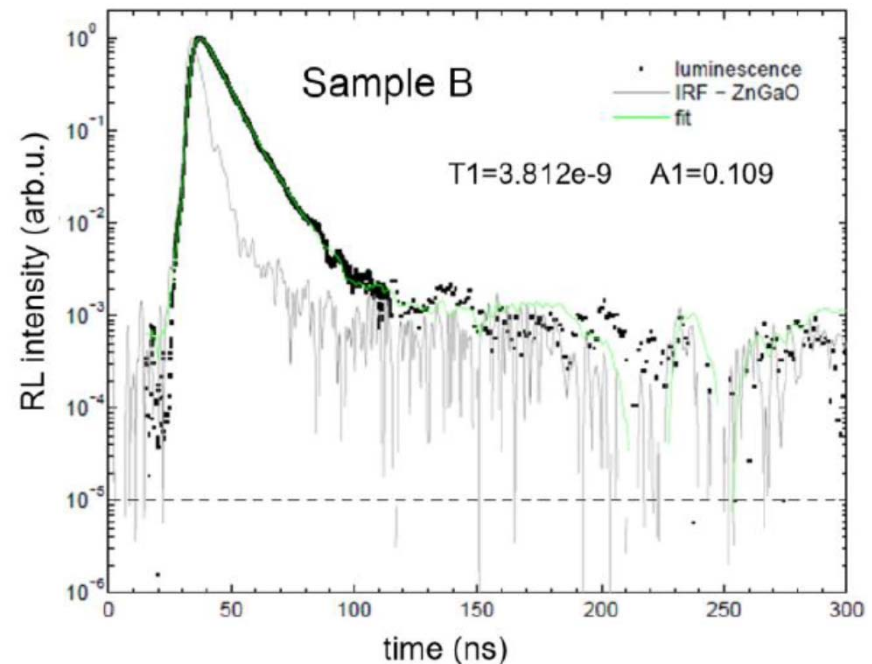
Rise time resolved
7 ps!

MQW structure can be further optimized

Photoluminescence spectra



Scintillation decay
Excitation SXR, 250-400 eV



PL decay time of excitonic emission can reach 1 ns and scintillation decay time is below 4 ns with slow components practically absent.

Measurement of latest sample set in CERN in 5/2018 with ps X-ray excitation!