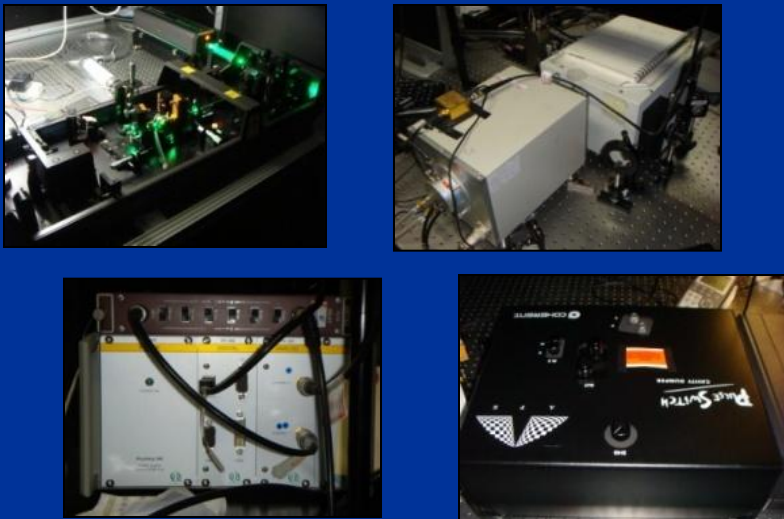


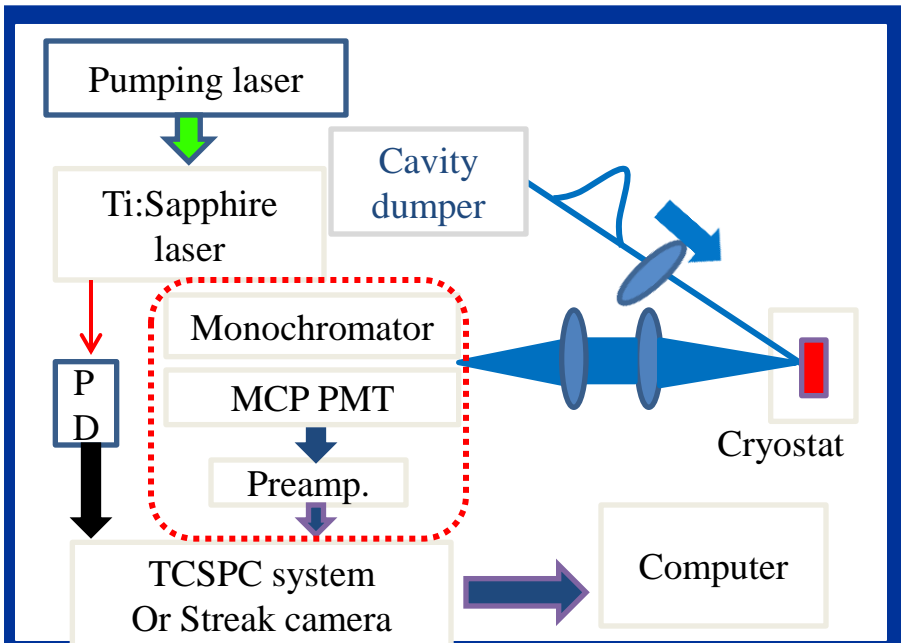
Time-resolved PL (TR-PL) System

Time-resolved PL Equipment



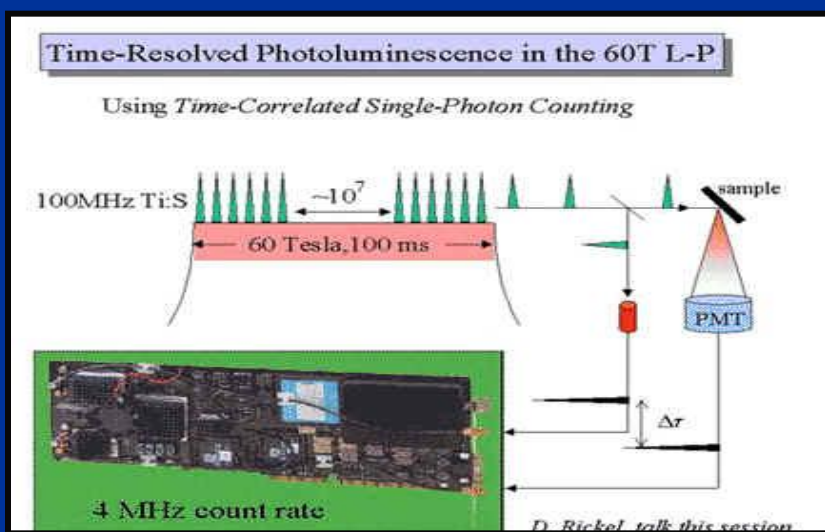
- In Time Resolved Photoluminescence, the sample is excited by a femto-second pulsed laser
- The electrons and holes created, recombine and luminesce during all their life time. The luminescence decay thus gives the excess carrier life time.

TR-PL Schematic

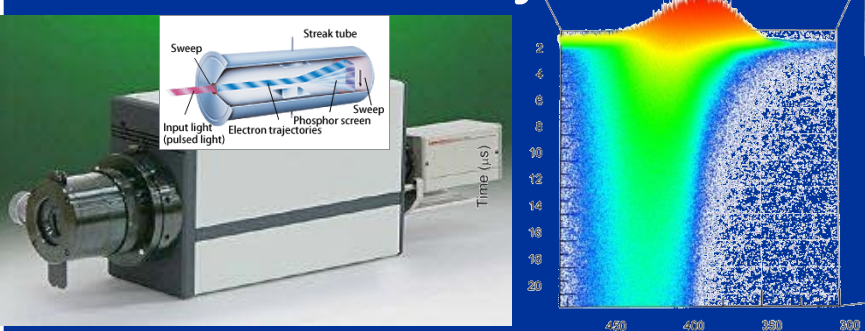


- CFD : constant Fraction Discriminator
- TAC : Time-to-Amplitude Converter
- MCA : Multi-Channel Analyzer
- MCP-PMT : Micro Channel Plate-PhotoMultiplier Tube

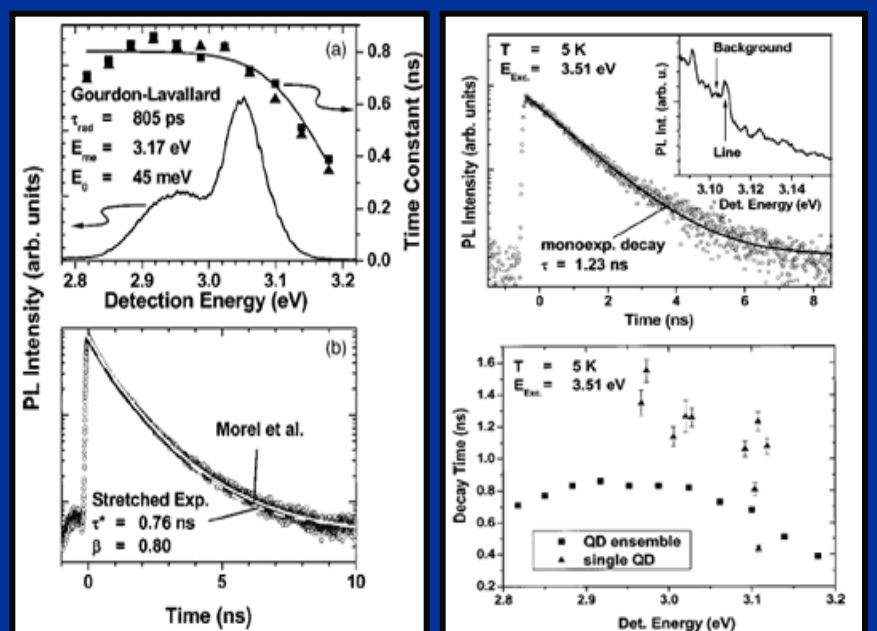
Principle of TR-PL



Streak camera system



TR-PL spectra



- Left: Time-integrated ensemble PL, time constant τ_e of the $1/e$ decay (squares) and the fitting parameter t^* (triangles).
- Right : Time-resolved PL of a single QD emission line (inset), fitted by a monoexponential decay (solid line). And spectral dependence of time constants for QD.