Deep UV Extension for the MicroTime 200

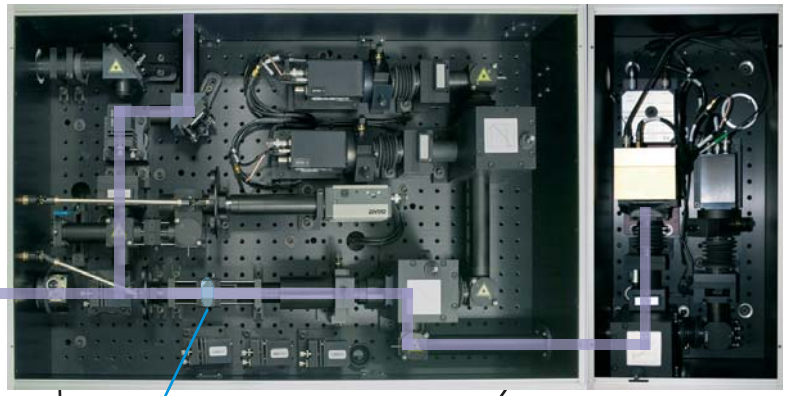
PicoQuant

- Excitation at 266 nm with compact diode based laser
- Quartz lenses and UV compatible optics
- UV objective and UV detector for optimal performance
- Parallel UV and VIS detection
- Label-free Fluorescence Lifetime Imaging Microscopy (FLIM)
- Label-free protein detection through intrinsic fluorescence

VIS excitation:
375 nm, 405 nm, ..., 640 nm

Deep UV excitation:

- 266 nm
- < 100 ps pulse width
- variable repetition rates from 1 MHz to 80 MHz



Modified main optical unit
with quartz optics, for parallel VIS and UV detection

to microscope

Quartz tube lens

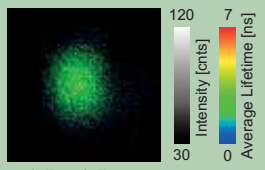
Modified microscope body:
quartz objective (glycerine immersion)

Detection extension unit with optimized PMT for UV detection: 42 % detection efficiency at 350 nm

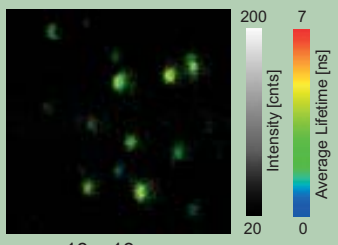
Deep UV Extension for the MicroTime 200

Applications

FLIM with streptavidin-coated beads
(Ø 500 nm, 1 streptavidin = 24 tryptophans)
immobilized on quartz coverslips



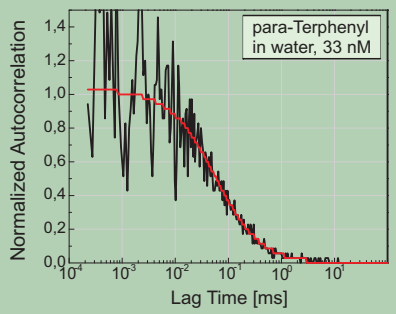
1.5 x 1.5 µm



13 x 13 µm

Dyes with high quantum efficiency in the UV: laser dyes as single emitters

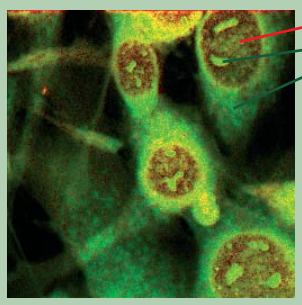
para-Terphenyl



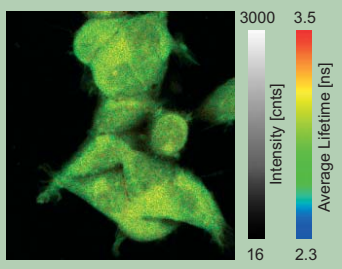
- diffusion time: t(diff) = 57 µs
- molecular brightness: 510 Hz per molecule
- data acquisition time: approx. 10 min

Label-free FLIM in the deep UV

Label-free FLIM with biological cells
→ aromatic amino acids within the proteins
(mainly tryptophans) become visible



3T3-L1 cells, fixed (methanol)
80 x 80 µm



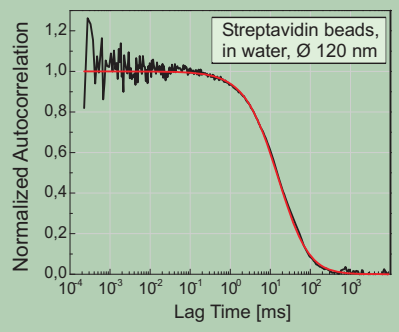
HEK293 cells, fixed
(paraformaldehyde)
73 x 79 µm

Sample courtesy of Astrid Tannert,
University of Leipzig, Germany

Benchmark: FCS in the deep UV

Streptavidin-coated beads
(Ø 120 nm)

approx. 1000 streptavidin per bead
(1 streptavidin = 24 tryptophans)



- diffusion time: t(diff) = 16 ms
- molecular brightness: 1.2 kHz per molecule
- data acquisition time: approx. 5 min

- excitation: 266 nm (PicoQuant), 20 MHz, < 100 ps pulse width
- quartz objective, 40x, NA 0.6, glycerine
- optical filters: Z266RDC, 300 nm longpass
- detection: PMT, 42 % detection efficiency at 350 nm

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