

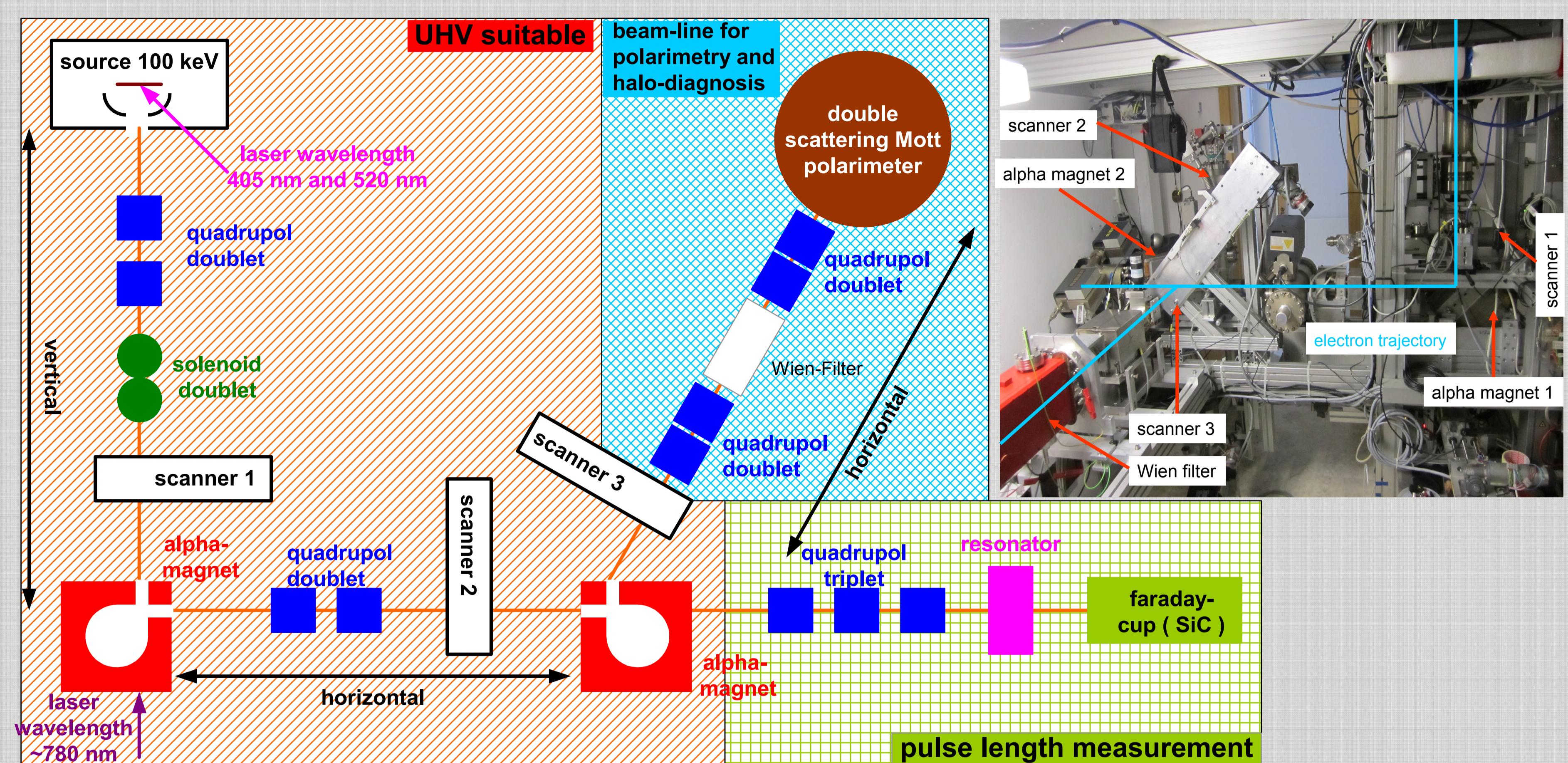
DIAGNOSTIC TEST-BEAM-LINE FOR THE INJECTOR OF MESA

BASIC PROPERTIES

investigations on beam diagnostics for mA class c.w. photo injectors

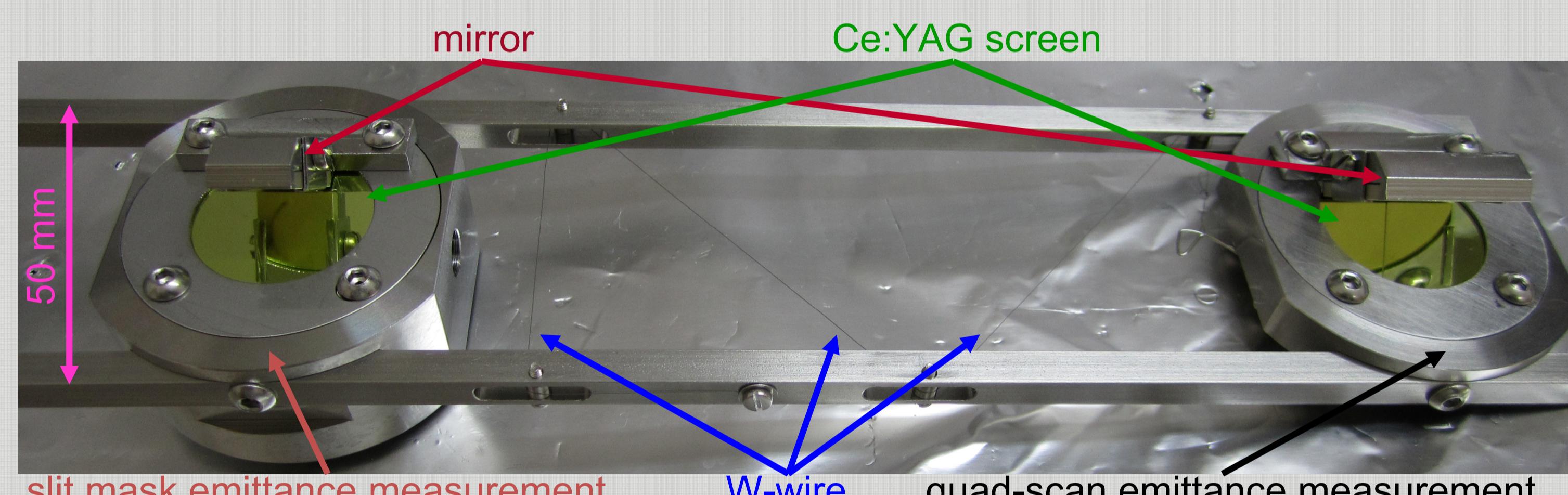
- 100 kV dc photo gun with GaAs photo cathode and load lock system
- rf synchronized laser system with 1.3 GHz repetition rate and 405 nm & 520 nm works as drive laser
- additional IR laser with 780 nm for polarimetry
- measurements with different laser diodes (LD)
- emittance measurements with quad scan and slit mask
- deflecting cavity to investigate temporal distribution
- perforated screens to investigate halo distribution
- diagnostic elements are UHV suitable and bakeable
- first test of a deflecting cavity prototype (1.3 GHz) and a chopper-collimator for MESA

SKETCH OF THE DIAGNOSTIC TEST-BEAM-LINE

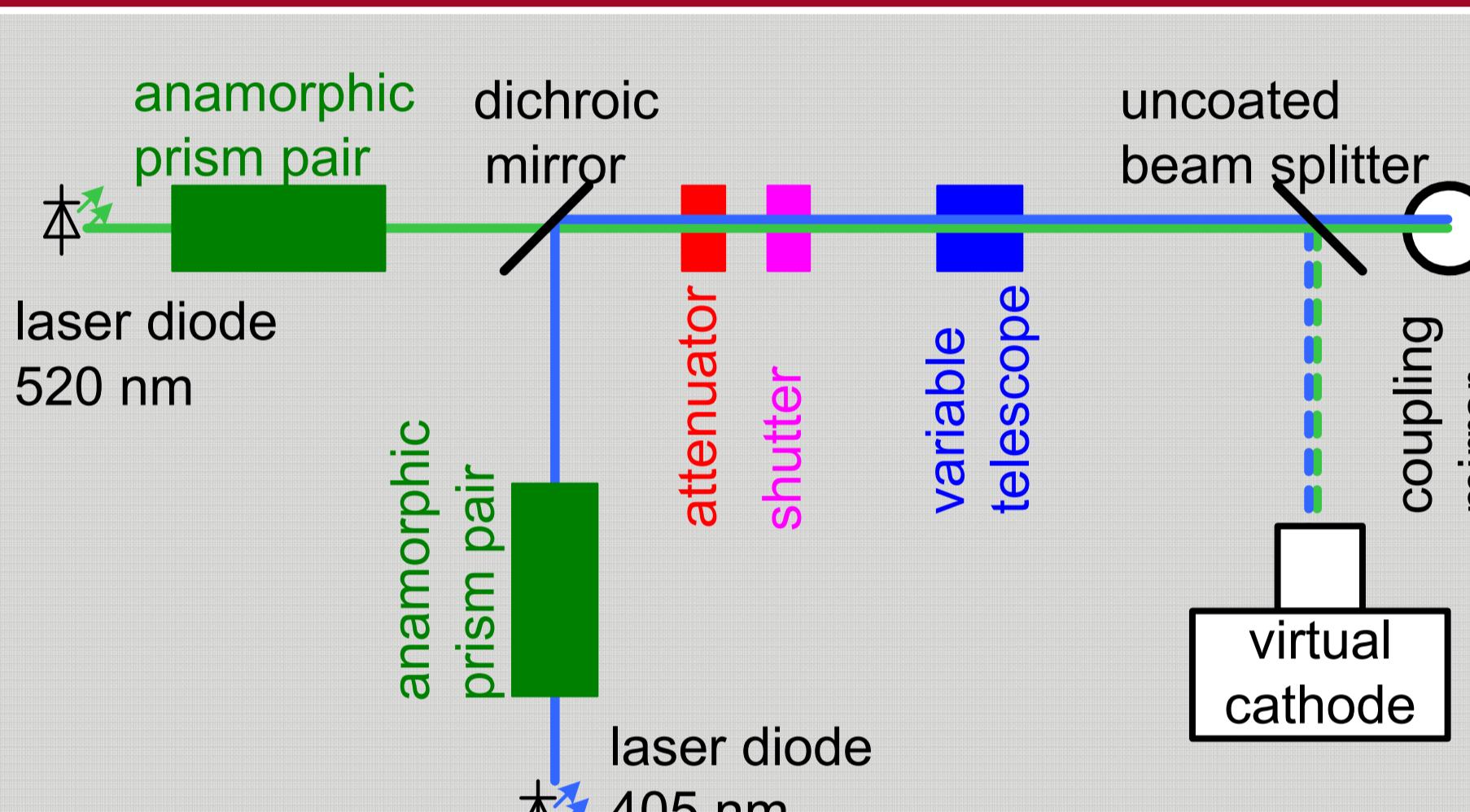


SCANNER DEVICE

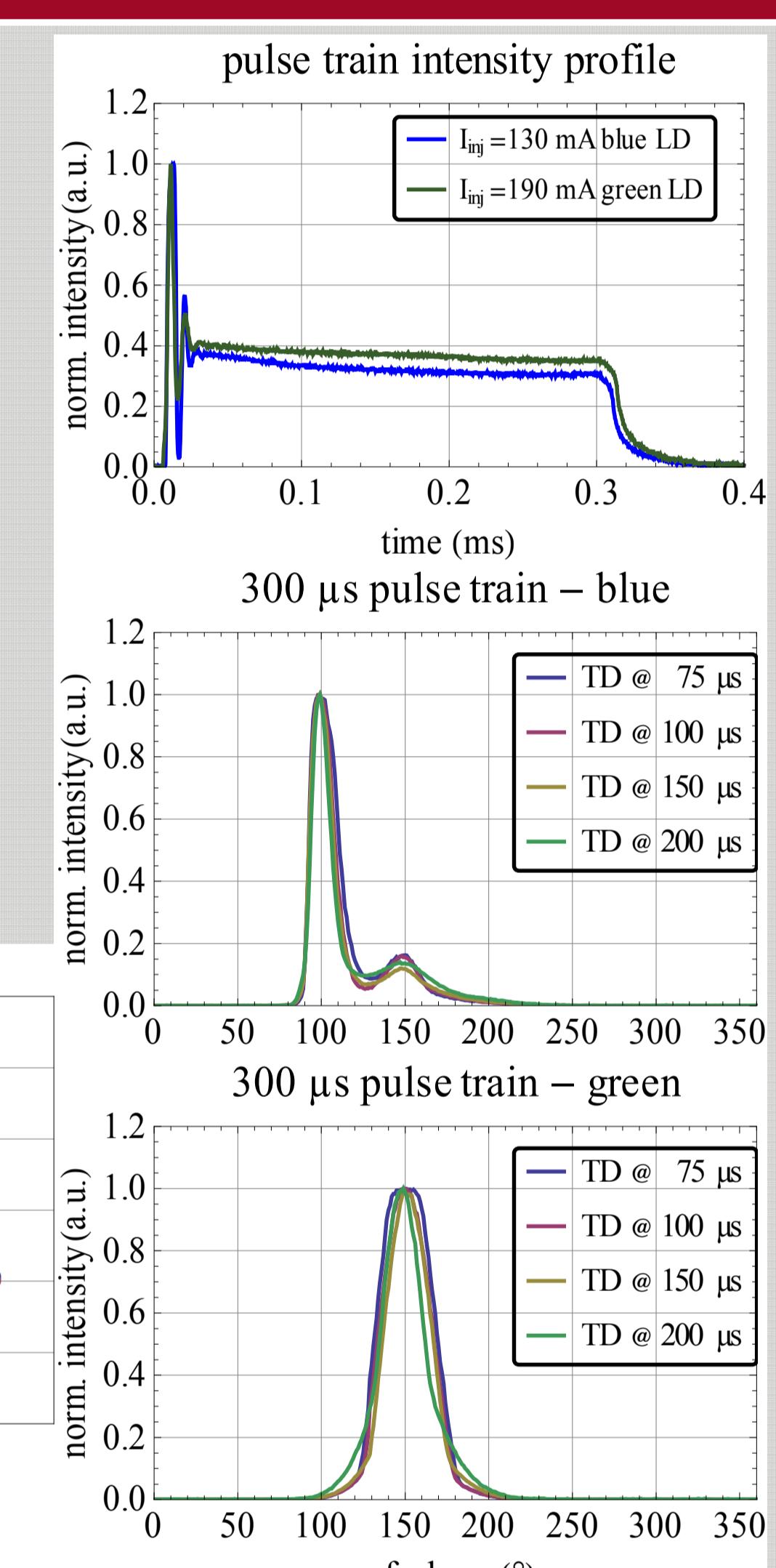
- scanner sleds are equipped with 100 μm thick Ce:YAG screens ($\varnothing = 25 \text{ mm}$)
- electron facing side of screens are coated with conductive material (Al)
- viewing direction is parallel to the surface normal (with 45° mirror)
- slit masks have 21 slits with 25 μm thickness and 250 μm spacing
- additionally installed 40 μm thick tungsten wire to make a cross check to the screen measurements
- scanner 3 has in sum three screens, they are coated with ITO in addition and two of them have a 2 mm or 3 mm hole to perform halo investigations



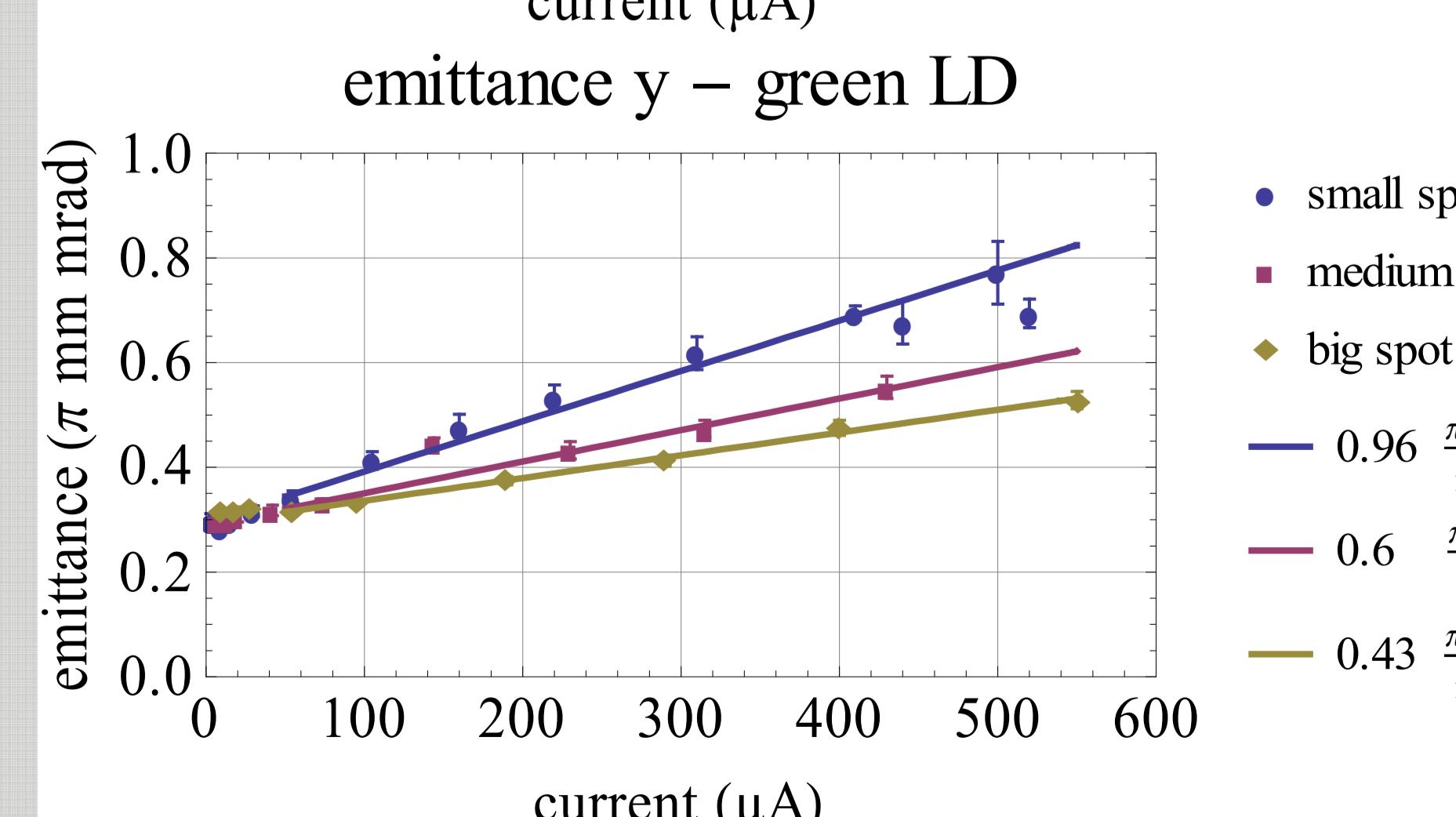
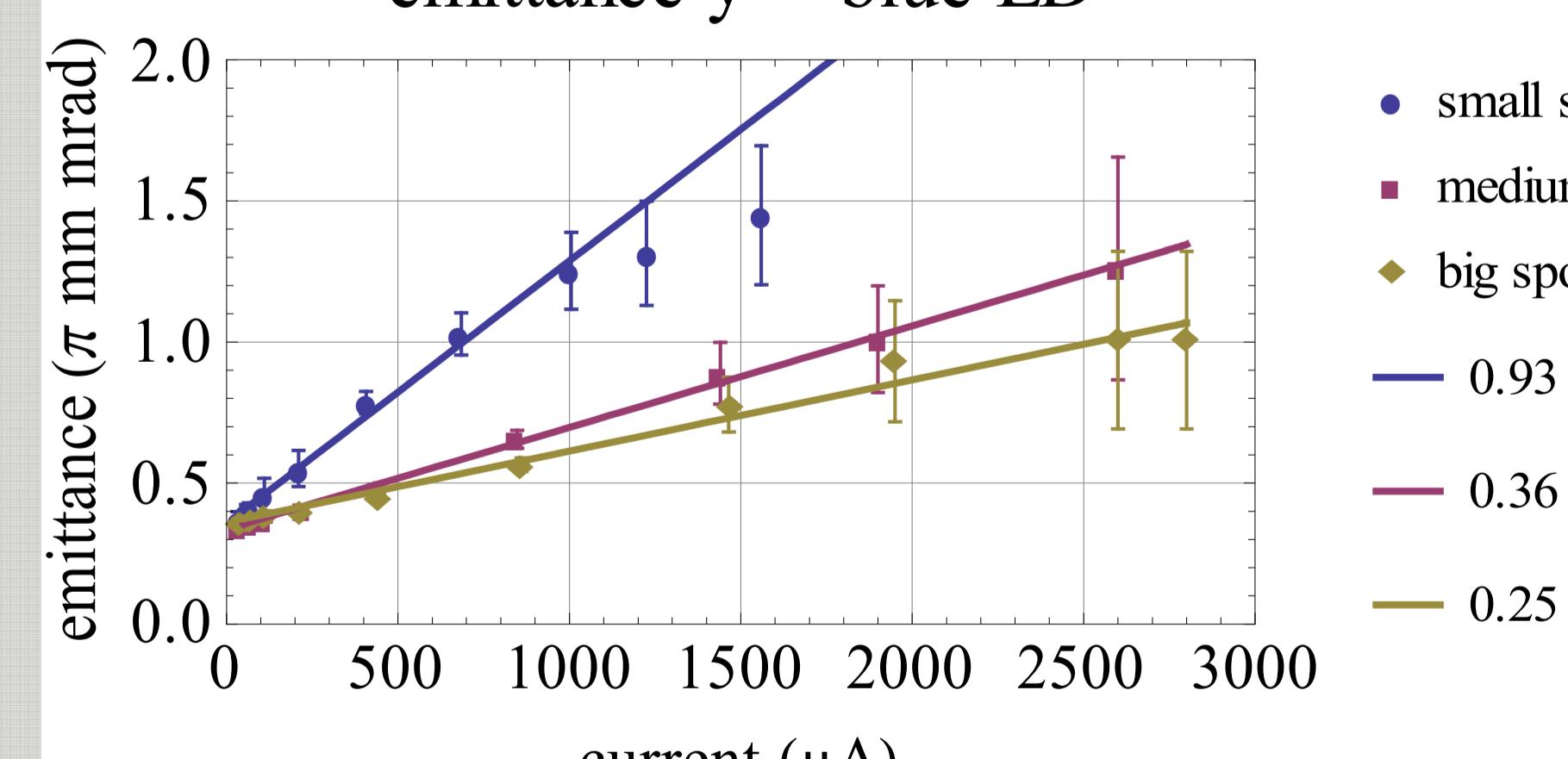
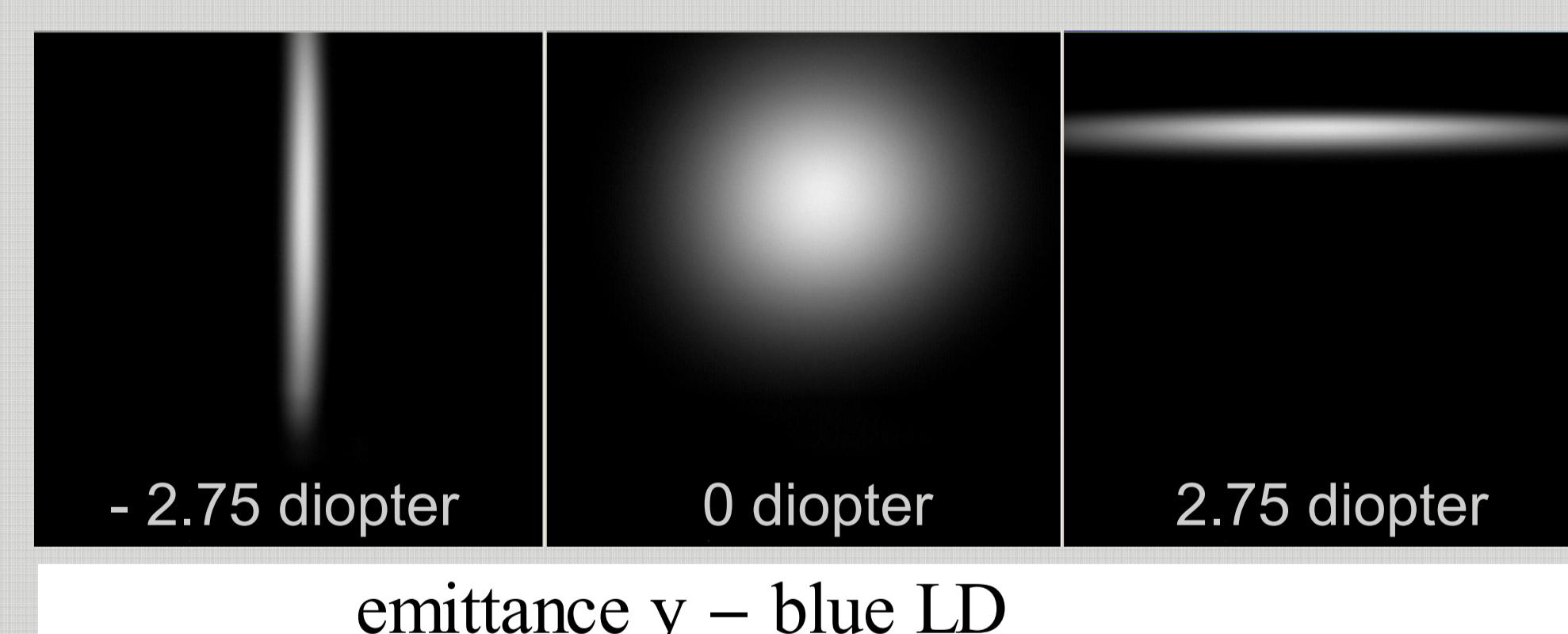
LASER SYSTEM



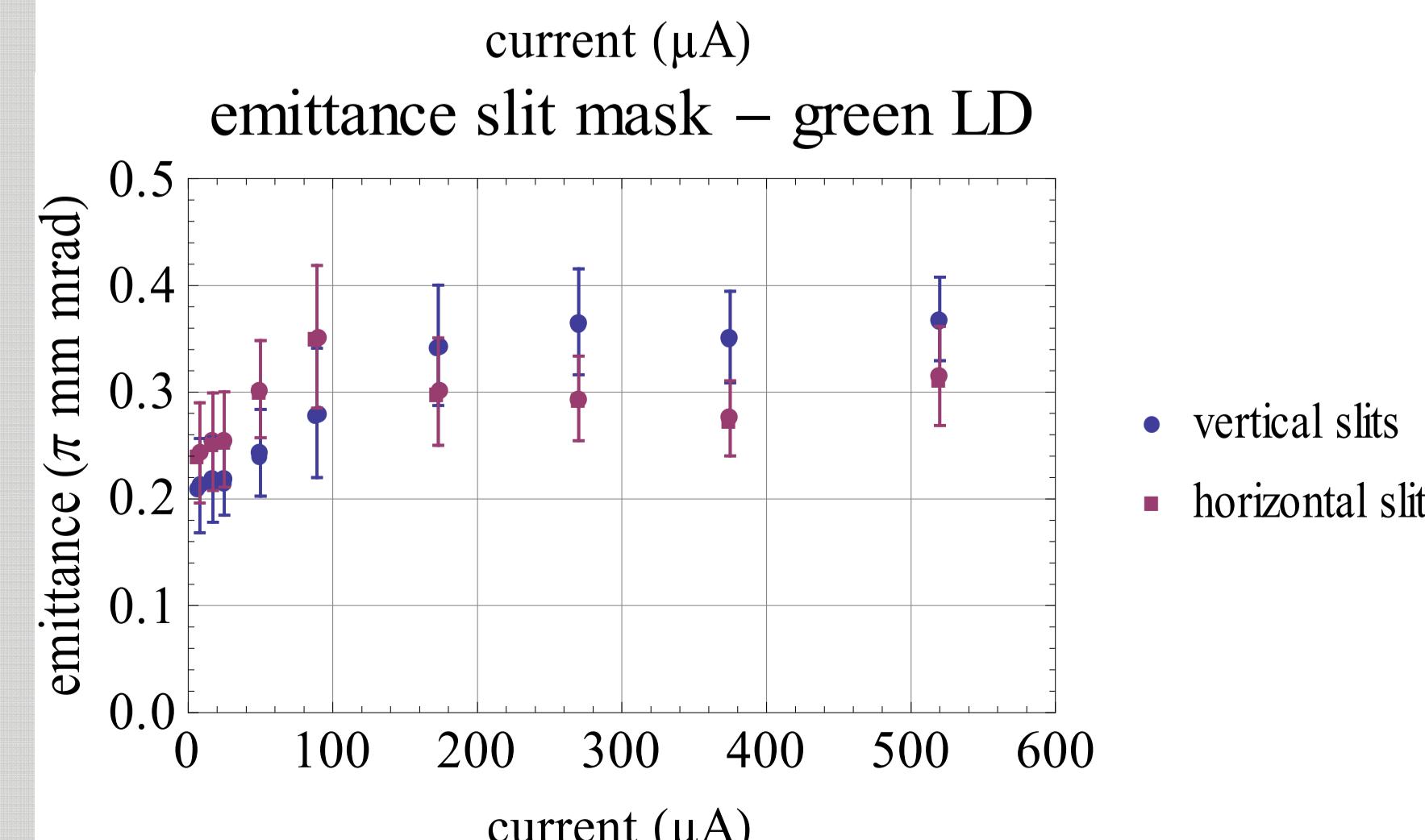
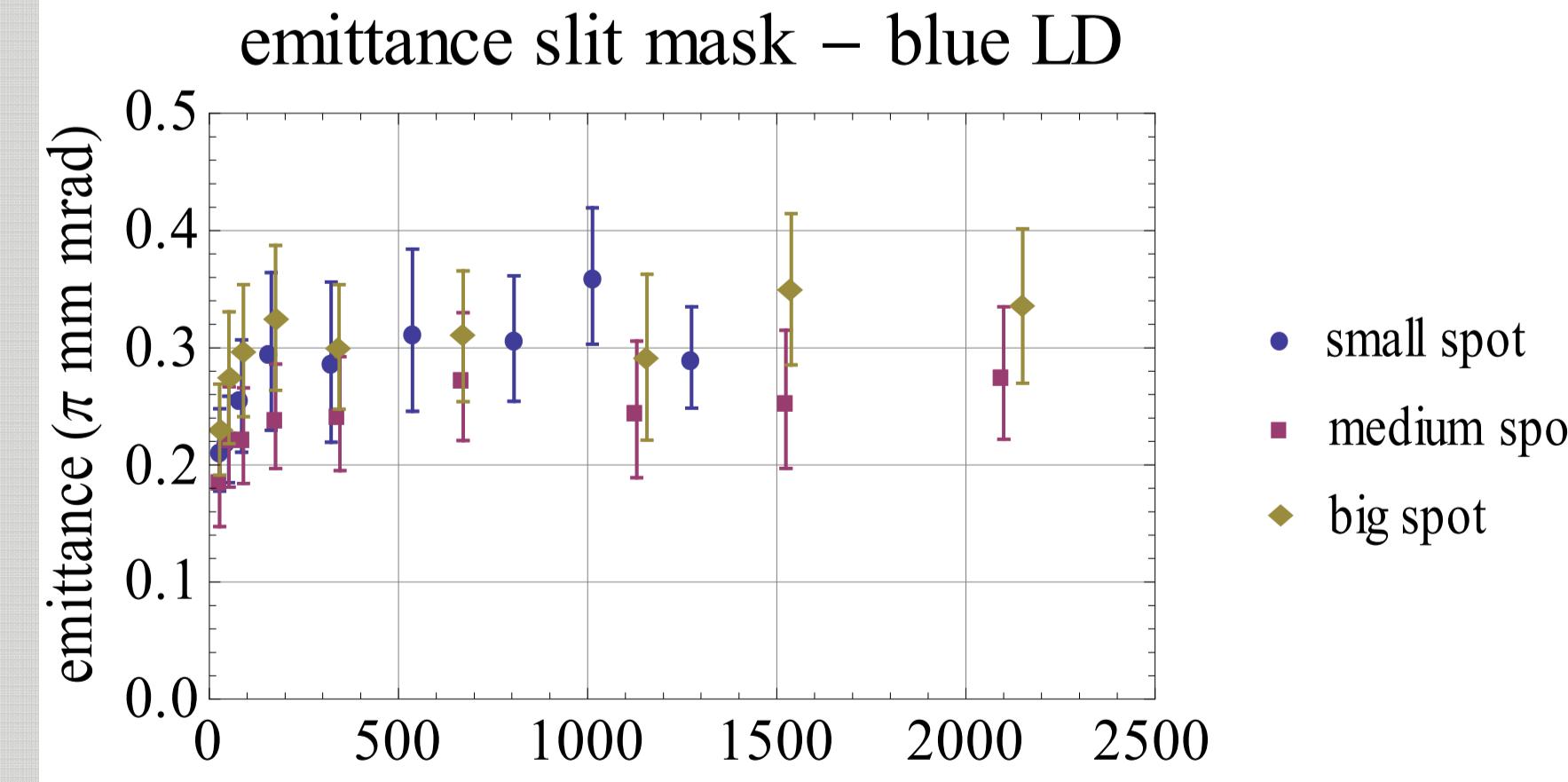
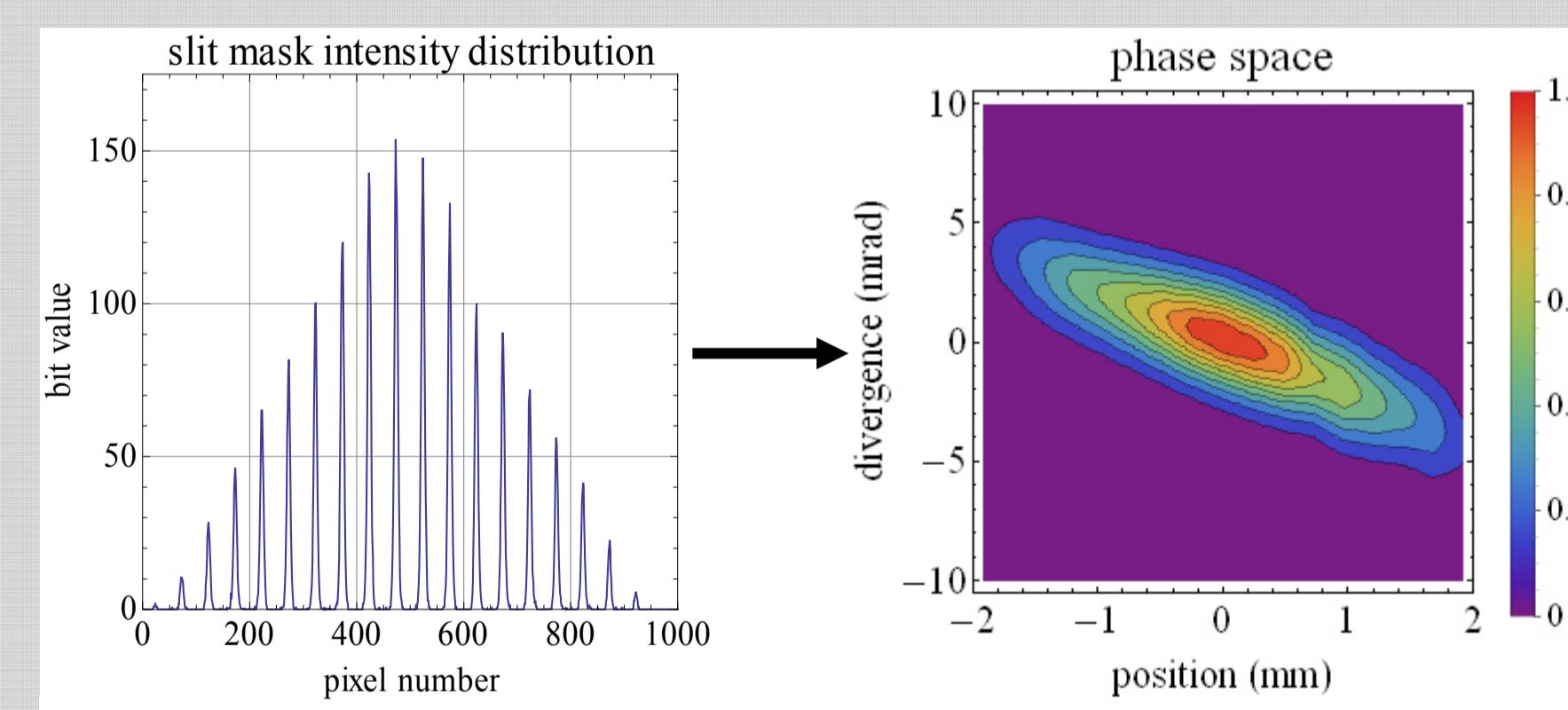
- variable repetition rate for pulse trains (5 – 1000 Hz)
- variable pulse train length (0.3 – 200 ms)
- rf synchronized pulses within the pulse trains
- output power up to 200 mW
- variable spot size on photo cathode (0.5 – 2.5 mm)



QUAD SCAN EMITTANCE MEASUREMENT



SLIT MASK EMITTANCE MEASUREMENT



TEMPORAL DISTRIBUTION (TD)

