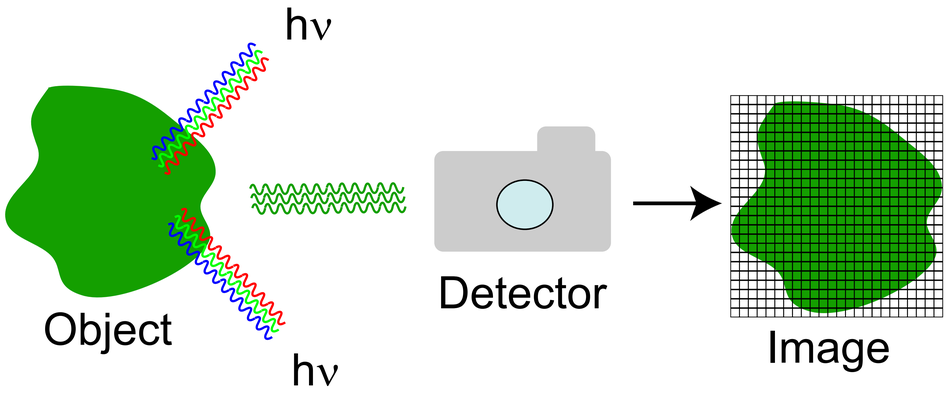
OPOTEK Inc.
Tunable Laser Systems

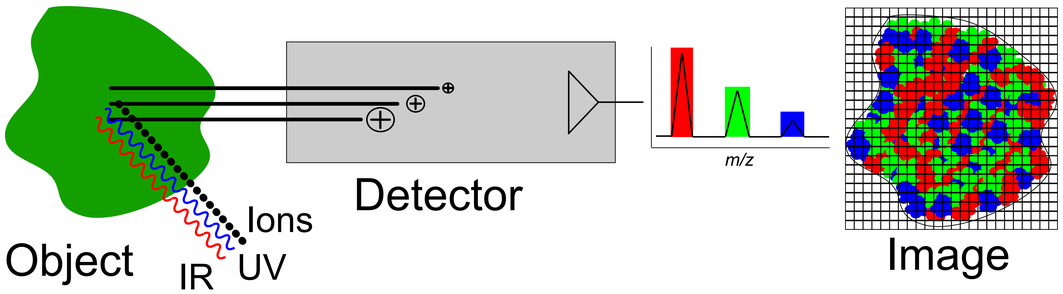
IR LDI MS for better MALDI imaging

Mark W. Little
Eli Margalith

Conventional Imaging



Mass Spectrometry Imaging (MSI)

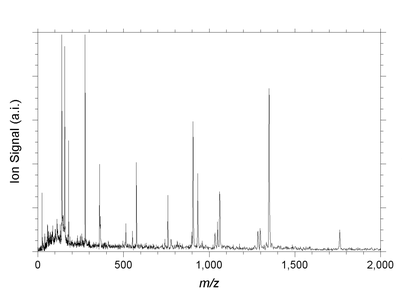


Features	Conventional Imaging	MSI
Illumination Source	Ambient/artificial light	- IR/UV laser (MALDI) - Ions (SIMS)
Detector	Digital camera	Mass Spectrometer
Resolution	CCD Pixel Size Lens Magnification	- Size of focused laser beam - Object features
Acquisition Speed	Single frame all at once	- Single pixel at a time - Size of object
Measurement	Reflected/transmitted light	Molecular mass image map
Quantification	Light intensity	Ion signal intensity (hard to reproduce)
Image construction	Illumination location on CCD	Color-coded ion signal correlated w/ XY location
Identification	Reference library	Molecular mass databases
Sampling	Non-destructive	Destructive

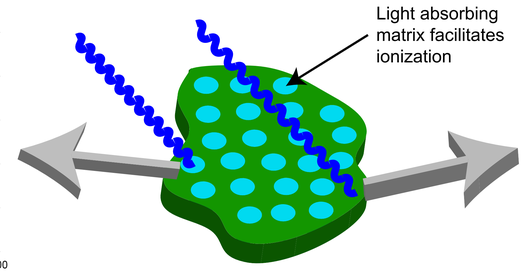
Come to Opotek's booth (#9) for more info.

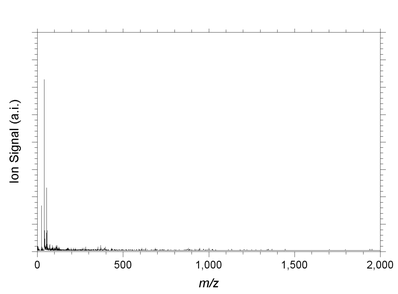
UV MALDI vs. IR LDI Imaging

UV MALDI



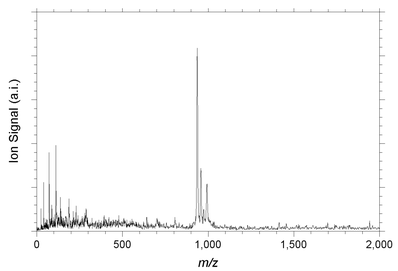
UV MALDI of a peptide mixture



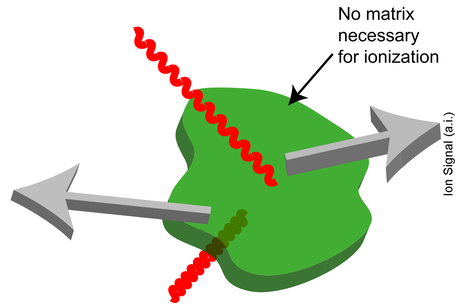


UV LDI of a peptide mixture
NO SIGNAL

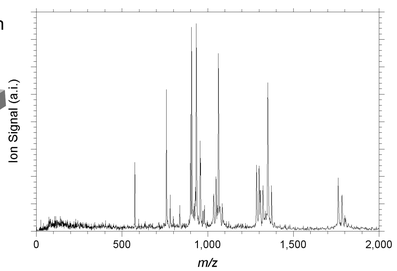
IR LDI



IR LDI of Angiotensin III
(backside illumination)



Greater penetration allows backside illumination; therefore a microscope objective can be used for better focusing (resolution)

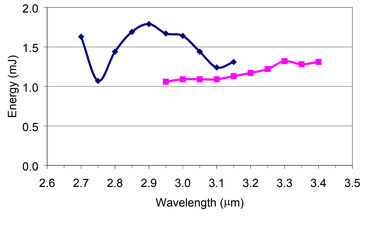


IR LDI of a peptide mixture
NO MATRIX NEEDED

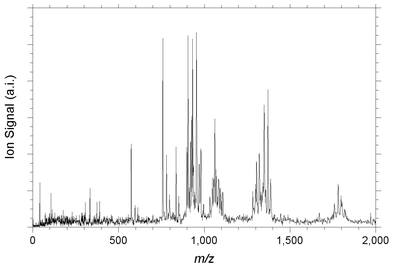
UV MALDI	IR LDI
amol – fmol sensitivity	fmol – pmol sensitivity
0.5 – >100kDa mass range	0.1 – 10 kDa mass range
0.1 – 1 kHz lasers	20 Hz lasers (100 Hz now available)
5 – 10 hrs for matrix deposition	No matrix sample prep
Matrix signal interference	Small molecule analysis (<0.5kDa)
Matrix crystals limit resolution (~100μm)	Transmission mode for better resolution (<10μm)
Image blur from matrix deposition	No matrix sample prep

High Rep IR laser solution for imaging

Tuning Curve



Opotek IR Opolette 100
100 Hz
2.7 to 3.4 μm
> 1.0 mJ
Small footprint (12" x 12")
355 nm option (UV MALDI)



IR LDI of a peptide mixture
using IR Opolette 100