NTS Toekomstige regelmogelijkheden

Resulten van Werk Pakket 3

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WAGENINGEN UR
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WP 3: BCO

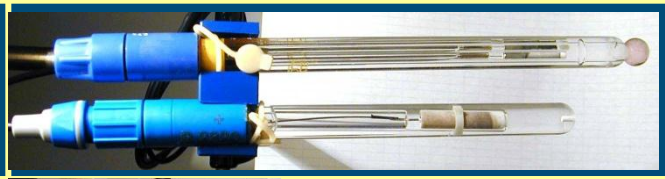
- Bruine de Bruin
- Telersvereniging Prominent (2)
- BLGG
- WUR (3)

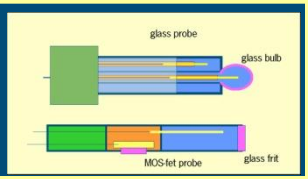
- DOEL 1: Ion Specifiek Meten
- DOEL 2: Regeling Verbeteren

ION SPECIFIEK METEN

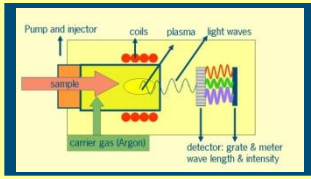
- ISE (Ion Specific Electrodes)
- ICP (Inductively Coupled Plasma)
- LIBS (Laser-induced breakdown spectroscopy)
- HPLC (High Performance Liquid Chromatography)
- Micro HPLC or Capillary Electrophoresis
- IS-FET (Ion Specific Field Effect Transistors)
- Image Optodes
- Nano Tube separated IS

ISE

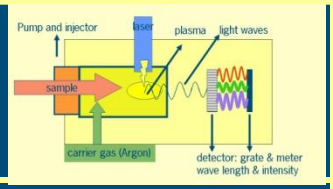




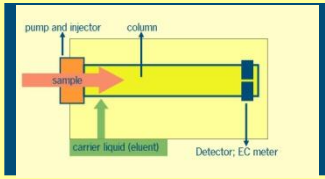
ICP



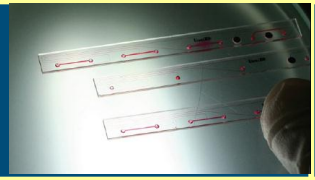
LIBS

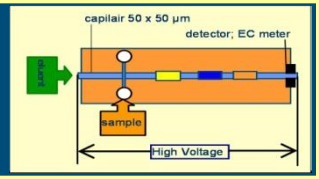


HPLC

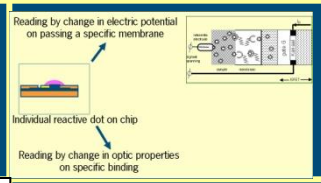


CE

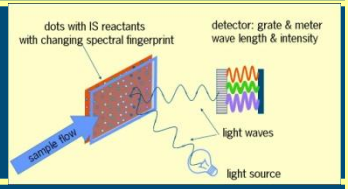




IS-FET



Optodes



Nano Tubes

ION SPECIFIEK METEN: bedrijven

Techniek	Producent	Applikatie	Ervaring	Metingen
ISE			Th. Gieling	Standaard
ICP	Spectro (GDR)	Sysmex	C. Blok	Lab
LIBS	Stellar Net (USA)			Nvt
HPLC	Applikon (NL)	PRIVA	C. Blok	Veld
CE	Capilix (NL)	BLGG		Lab
IS-FET	Univ. Enschede	Hortimax	Th. Gieling	Lab/veld
Optodes	Univ. Jülich (GDR)		C. Blok	Lab/veld
Nano Tubes	ClearGrow (IR)	PRIVA		

REGELING VERBETEREN: Roos nu

- Regeling op vaste EC (0.8 $dS.m^{-1}$) vanuit de drain
- Is een dynamische regel beter (50% van gift EC)?
- Aantonen principe op basis van dataset roos

REGELING VERBETEREN: aan- en afvoer balans

jaar	week	gift	drain	gift-EC	drain-EC	gift-NO_3	drain-NO_3
yr	wk	$l.m^{-2}$	$l.m^{-2}$	$dS.m^{-1}$	$dS.m^{-1}$	$mmol.l^{-1}$	$mmol.l^{-1}$
A	B	C	D	E	F	G	H
2007	47	2.6	1.2	1.8	1.8	7.9	9.9
2007	48	2.5	1.1	1.9	1.9	7.9	9.3
2007	49	2.4	1.2	1.9	2.0	7.9	9.2
2007	50	2.5	1.2	1.9	2.0	7.6	9.4
2007	51	2.9	1.8	1.9	1.9	6.8	9.5
2007	52	2.4	1.2	1.9	1.9	6.8	10.3

REGELING VERBETEREN: Liter/m^2 wordt mol/m^2

wk	drain-fractie	unit-fractie	spui	Directe spui	nitraat gift	nitraat lozing	nitraat lozing
wk	**l.l-1**	**l.l-1**	**l/m2**	**l/m2**	**Mol/m2**	**Mol.m2**	**% gift**
B	**I**	**J**	**K**	**L**	**M**	**N**	**O**
	F9*E	**1-I**	**D-I*C**	**ABS(K)**	**G*C**	**H*L**	**N/M**
47	44%	56%	0.08	0.1	20.6	0.8	4%
48	42%	58%	0.04	0.0	19.6	0.4	2%
49	42%	58%	0.20	0.2	18.8	1.9	10%
50	42%	58%	0.15	0.1	18.8	1.4	7%
51	41%	59%	0.55	0.5	19.9	5.2	26%
52	42%	58%	0.25	0.3	16.0	2.6	17%

REGELING VERBETEREN: Vergelijking

Tabel 1. Effect van spui regelingen op de uitstoot van water en nitraat.

Regeling	gift nitraat Mol.m2	spui nitraat Mol/m2	%	spui reële l/m2	spui reële l/m2	%
0.70 EC	1410	212	15.1%	1329	154	11.6%
0.80 EC	1410	128	9.1%	1329	92	7.0%
0.90 EC	1410	64	4.5%	1329	46	3.5%
Dynamisch 40%	1410	191	13.5%	1329	145	10.9%
Dynamisch 50%	1410	71	5.1%	1329	55	4.2%
Dynamisch 60%	1410	15	1.1%	1329	11	0.9%

REGELING VERBETEREN: Conclusies

- Verbeterde regelingen bespaart 50% of meer spui
- Eerst natrium, groeiremmers en GBW elimineren!
- Interessant omdat;
  - Maatschappelijke verplichting
  - Nabewerken ivm GBM wordt goedkoper
  - Meer inzicht in de teelt (opbrengst perspectief).

Wageningen UR Glastuinbouw

Innovaties vóór en mét de glastuinbouw





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REGELING VERBETEREN: Rol natrium

		Droog jaar (496 mm)			Nat jaar (1090 mm)		
bassin	natrium gehalte	spui direct	spui totaal	spui totaal	spui direct	spui totaal	spui totaal
M3/ha	Mmol/l	m3/ha	N	P	m3/ha	N	P
500	0.1	1%	5%	7%	1%	5%	7%
500	0.5	4%	17%	18%	2%	12%	12%
500	1.5	15%	54%	51%	7%	28%	27%
1500	0.1	1%	5%	7%	1%	7%	8%
1500	0.5	3%	14%	14%	2%	10%	10%
1500	1.5	12%	42%	41%	4%	17%	17%

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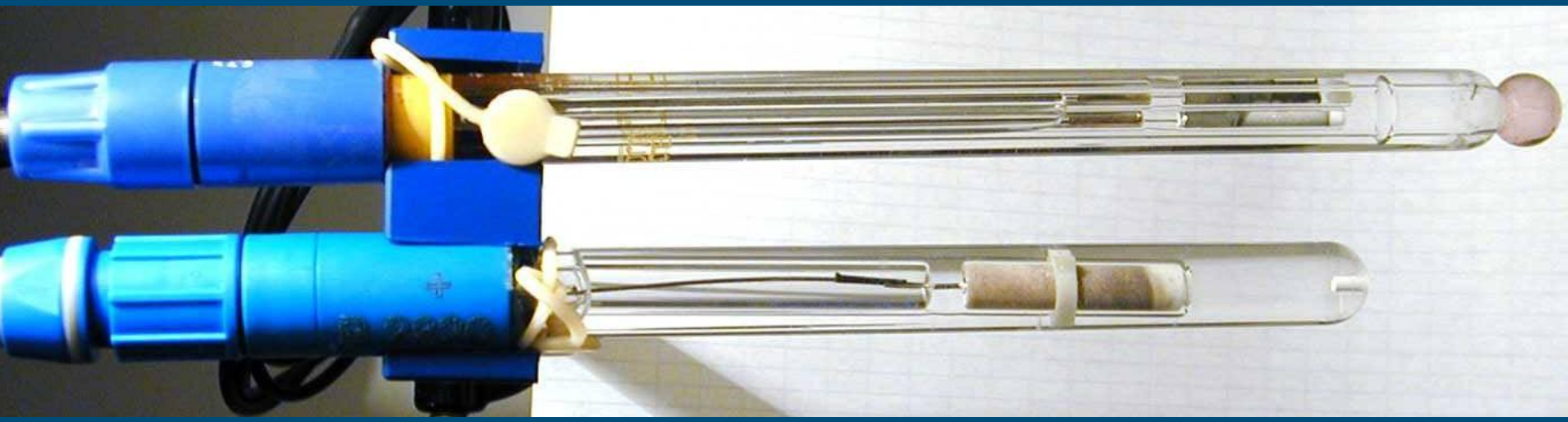
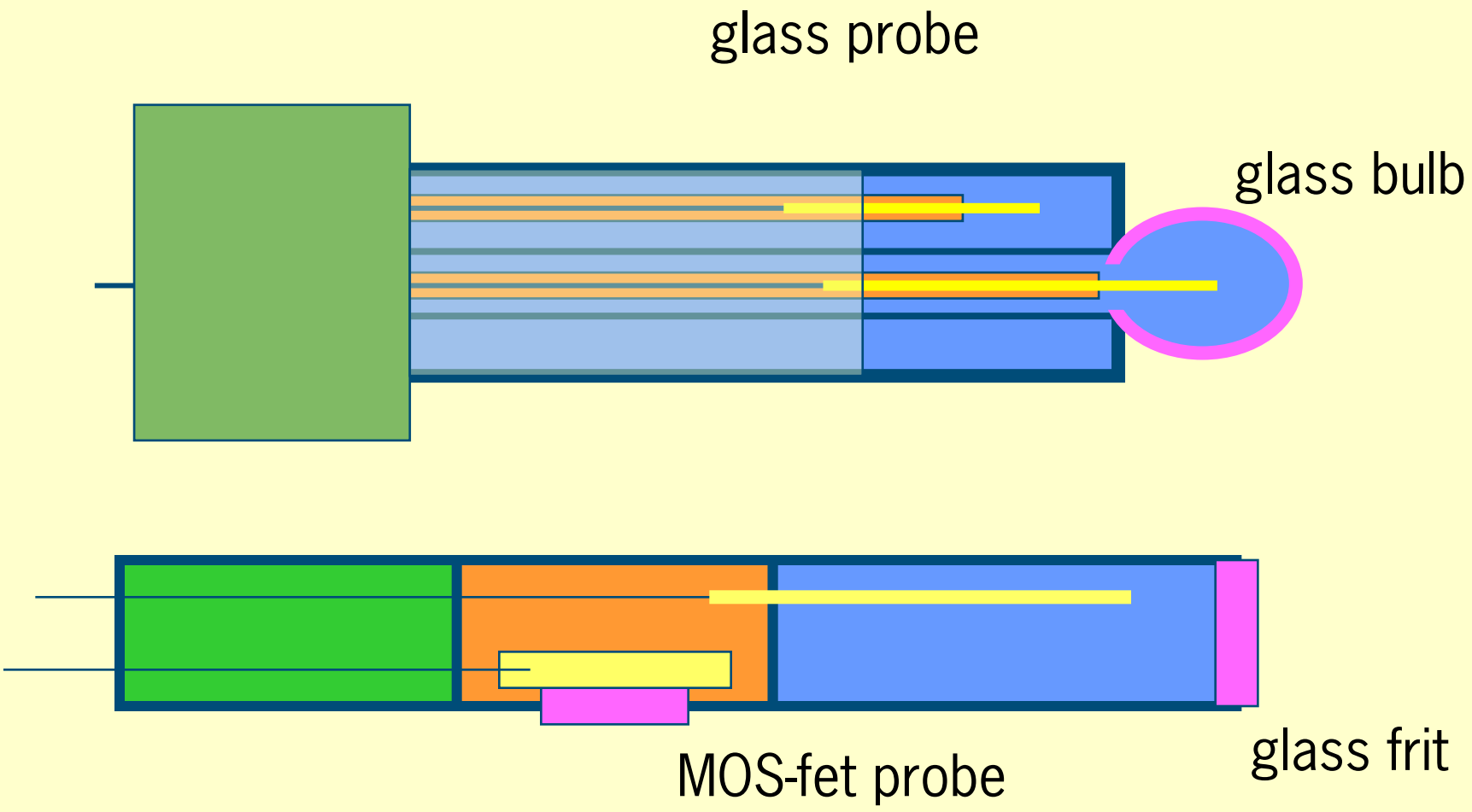
ISE, Ion Specific Electrodes

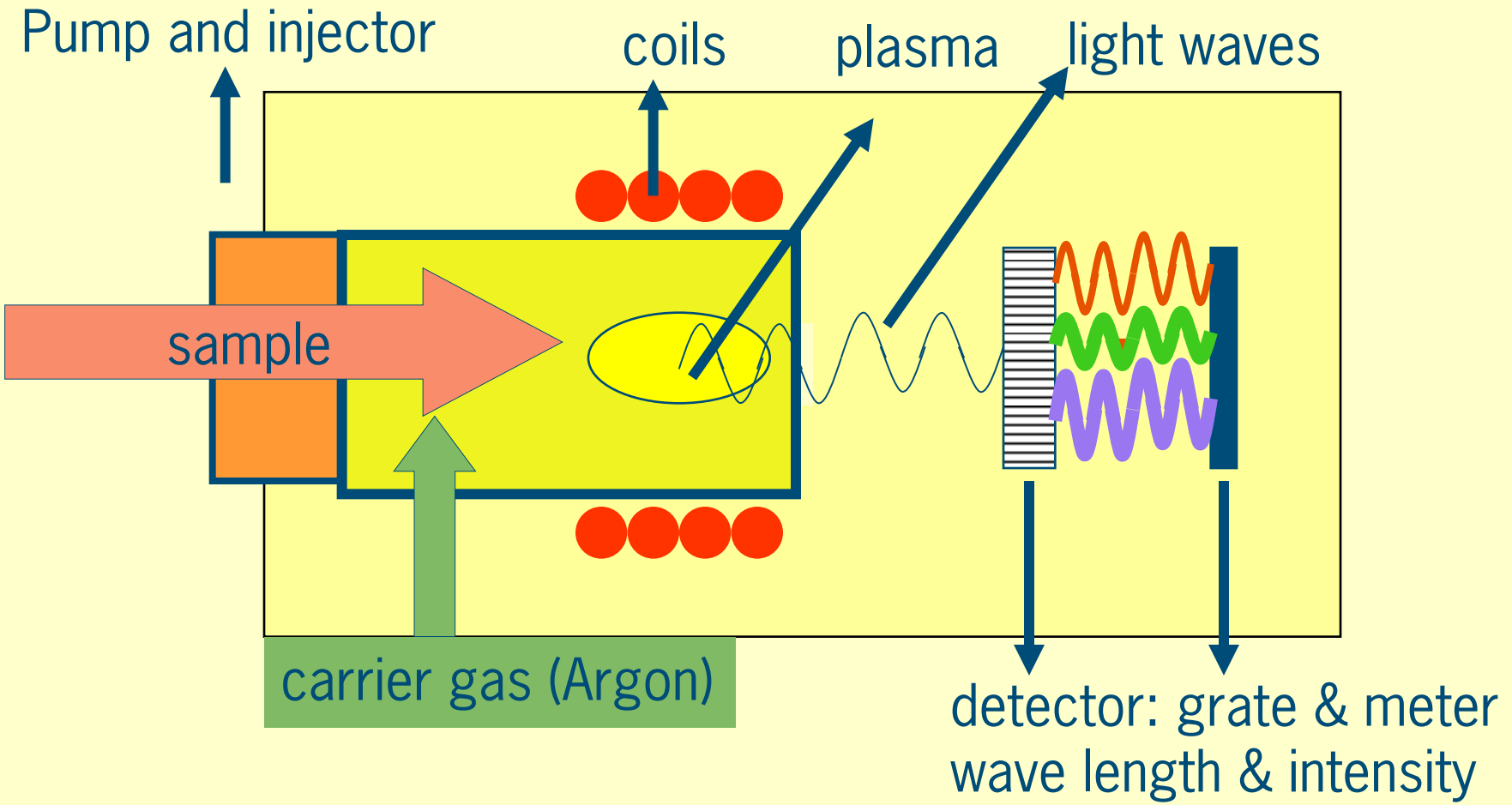


ISE, Ion Specific Electrodes



ICP, inductively coupled plasma

ICP, inductively coupled plasma



LIBS: laser induced breakdown spectroscopy

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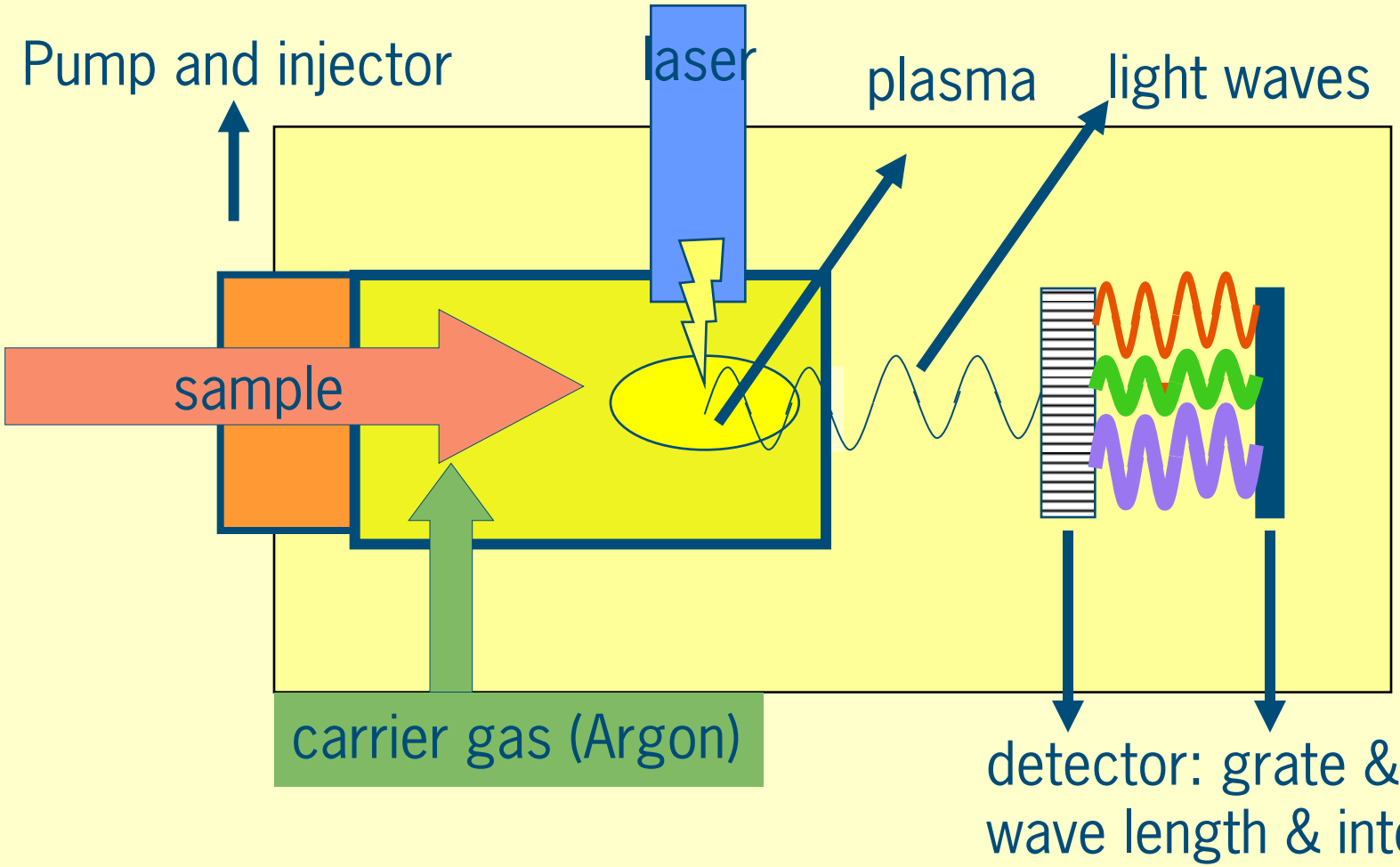
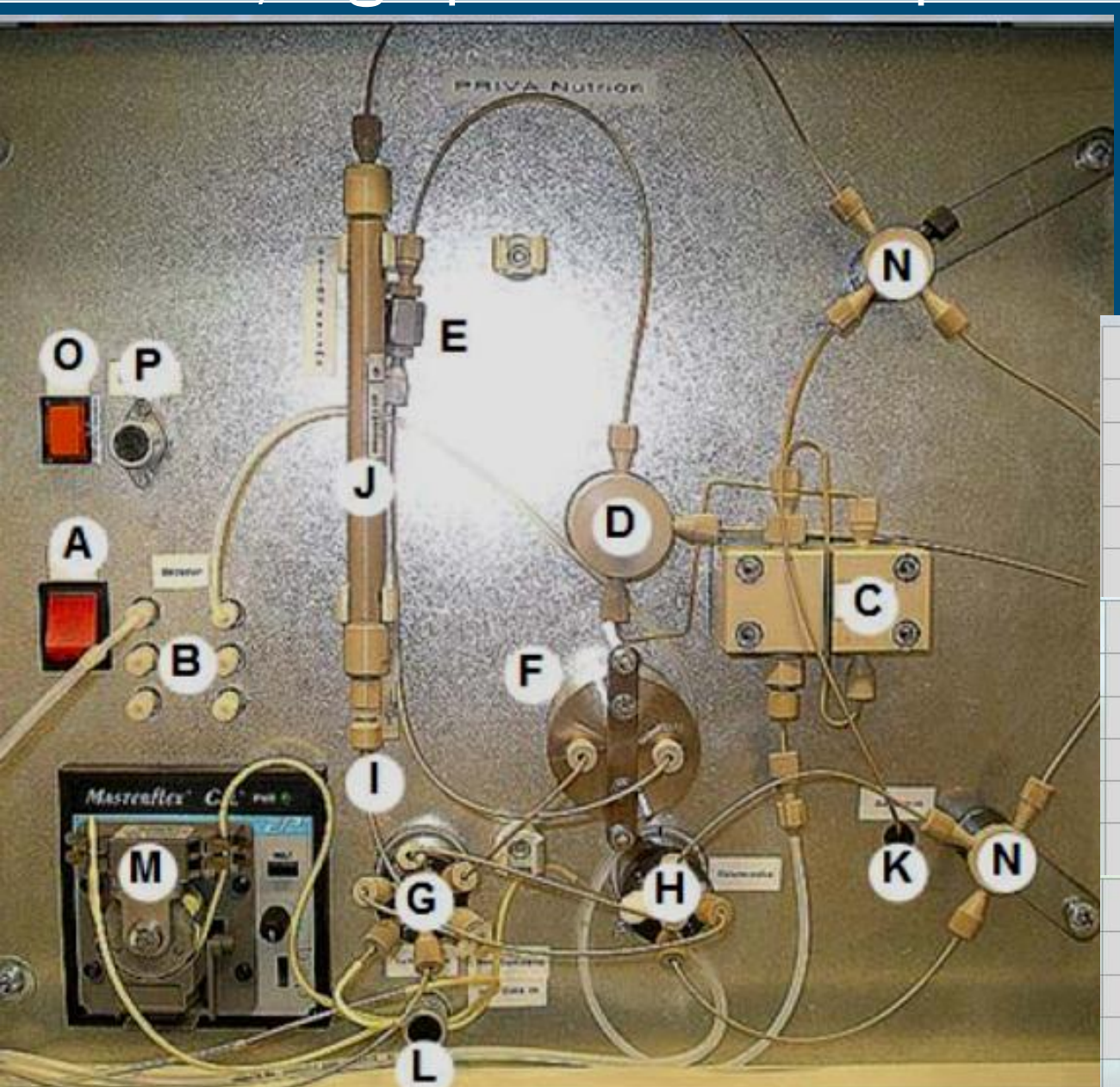
LIBS: laser induced breakdown spectroscopy

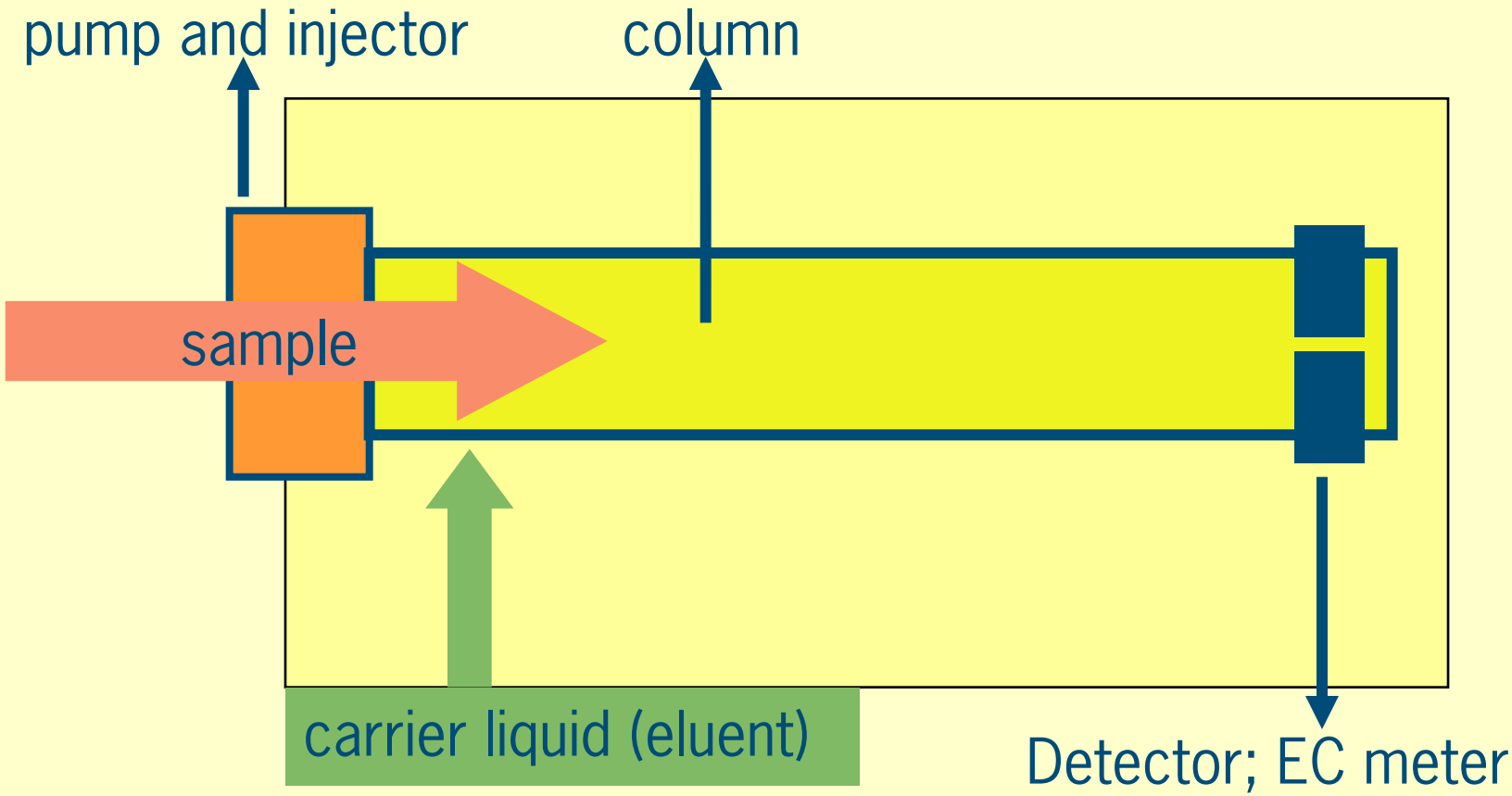


HPLC, high performance liquid chromatography

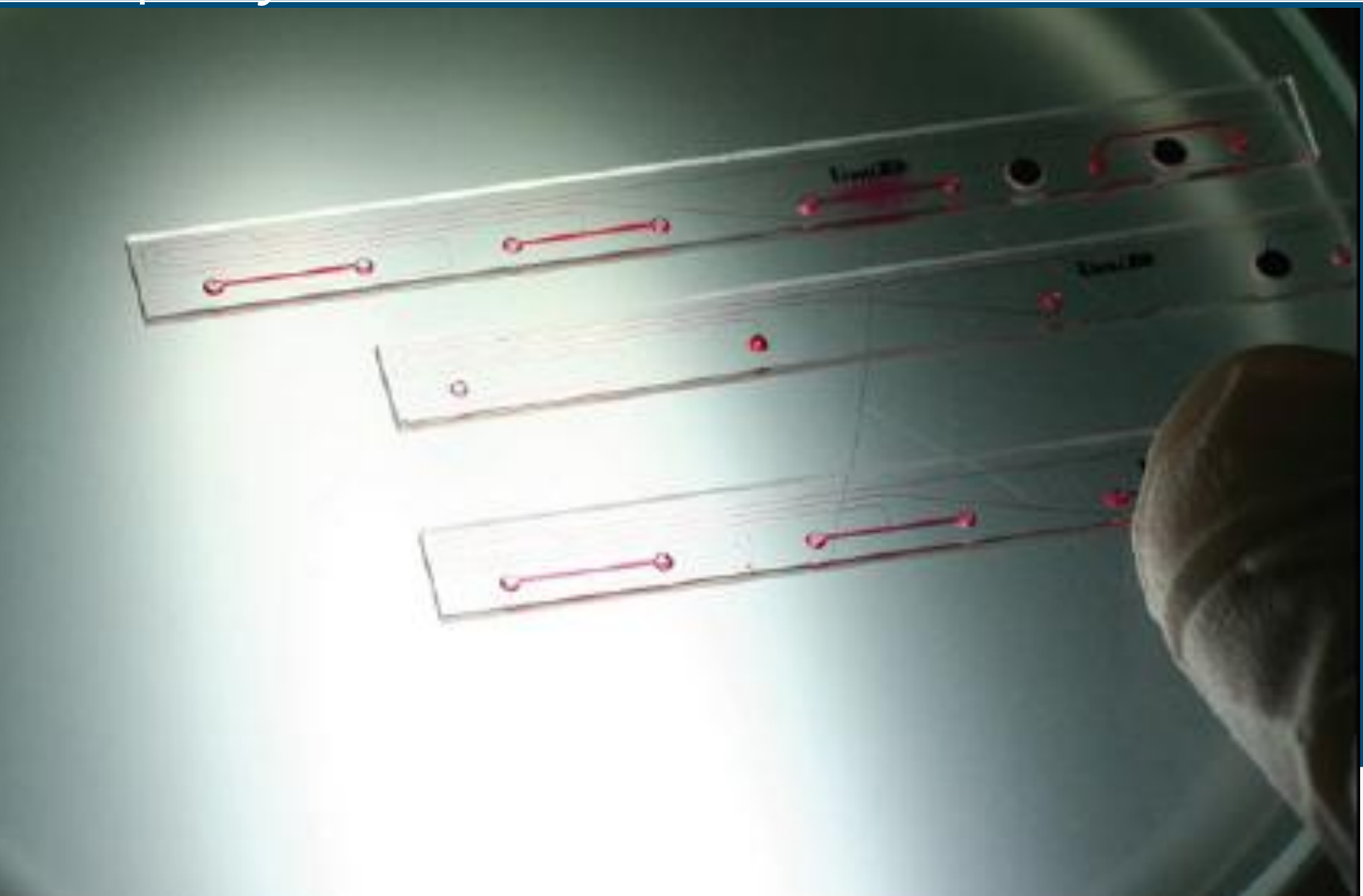


A	Hoofdschakelaar
B	Ontgasser
C	HPLC pomp
D	Ontluchtingspunt
E	Grof filter
F	Pulsdemper
G	Injectieklep
H	Kolom selectieklep
I	Voorkolom
J	Scheidingskolom (kation)
K	EC detector
L	Monster selectieklep
M	Monstervulpomp
N	Kruisstukken
O	Uit-/Resetknop software
P	Eluent selectieklep

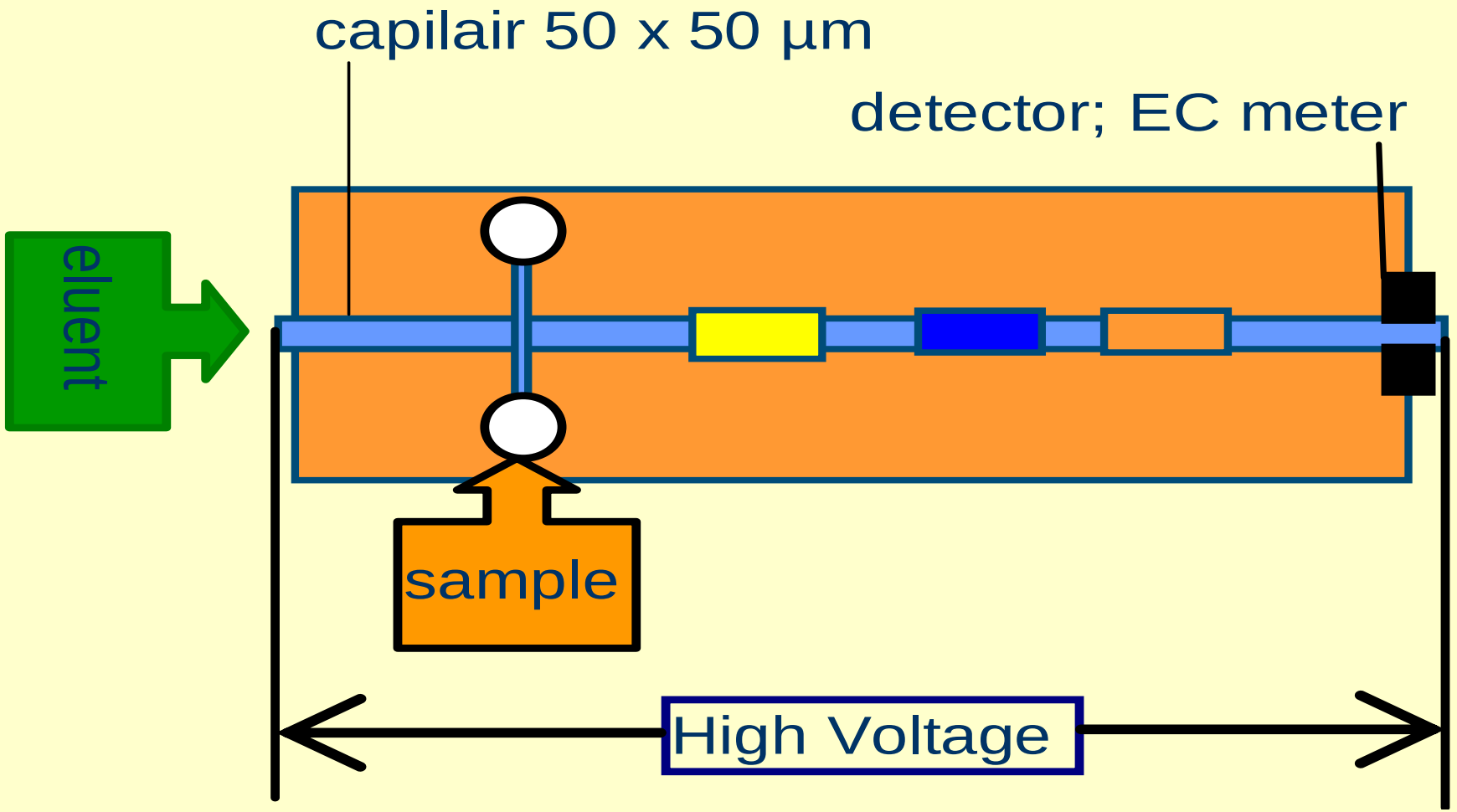
HPLC, high performance liquid chromatography



Capillary Electroforesis

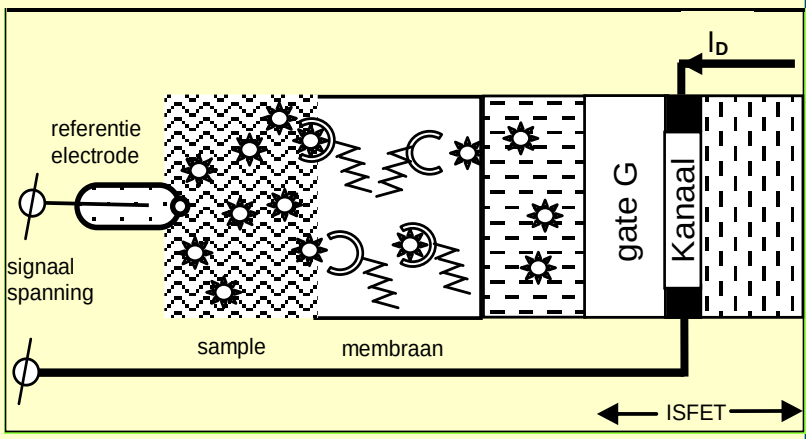


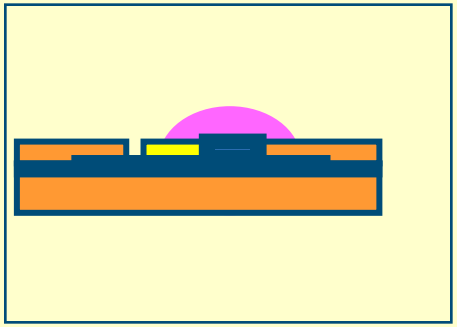
Capillary Electroforesis



IS, ion sensitive probes, micro scale

Reading by change in electric potential on passing a specific membrane





Individual reactive dot on chip

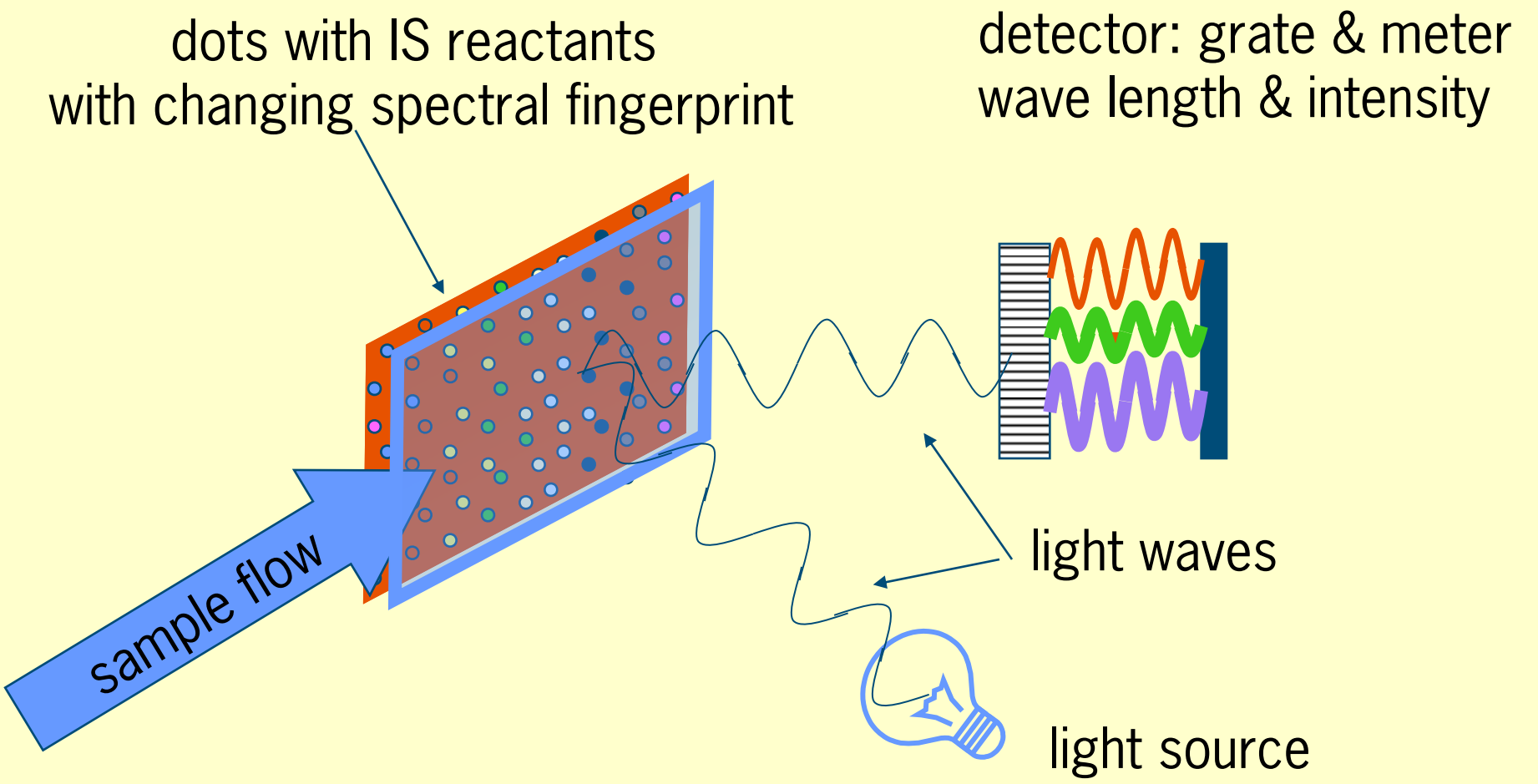
Reading by change in optic properties on specific binding

Image optodes

Fiber optic connection towards a spectrofotometer

Reactive window

Image optodes



NANO TUBE IS