

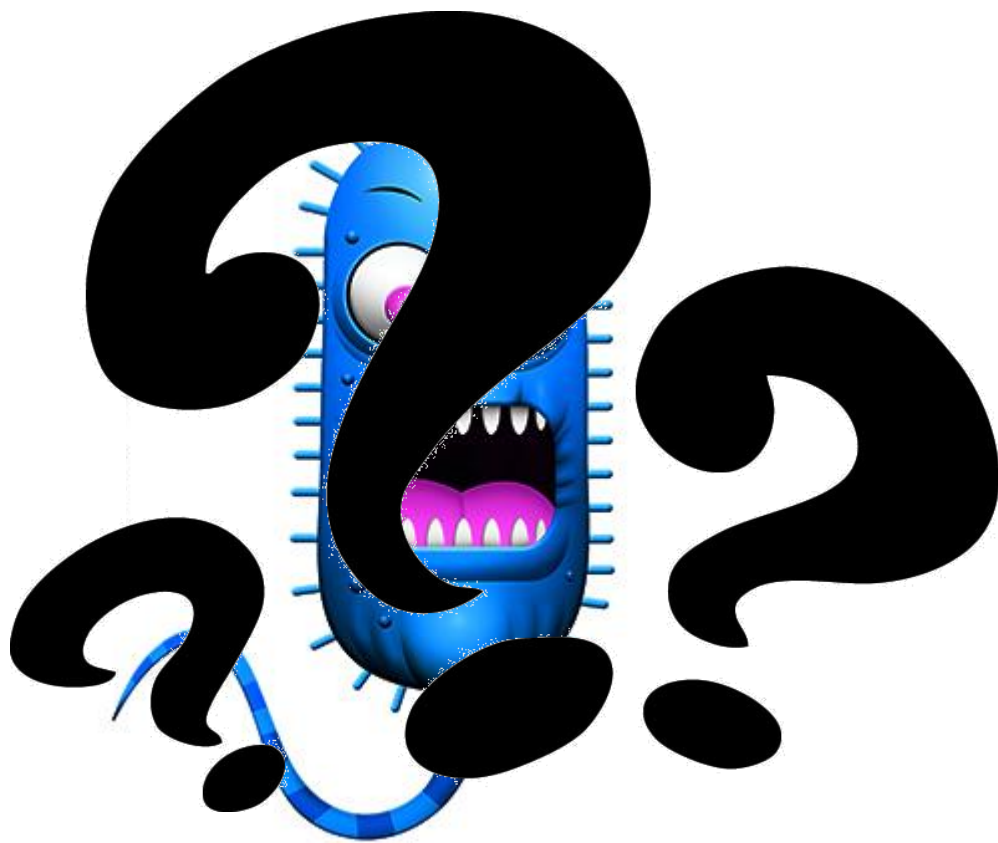
Optimalisaties van een biosensorplatform met ringresonatoren voor toepassingen in DNA-detectie

Sam Werquin

promotoren: Peter Bienstman en Peter Dubrueel

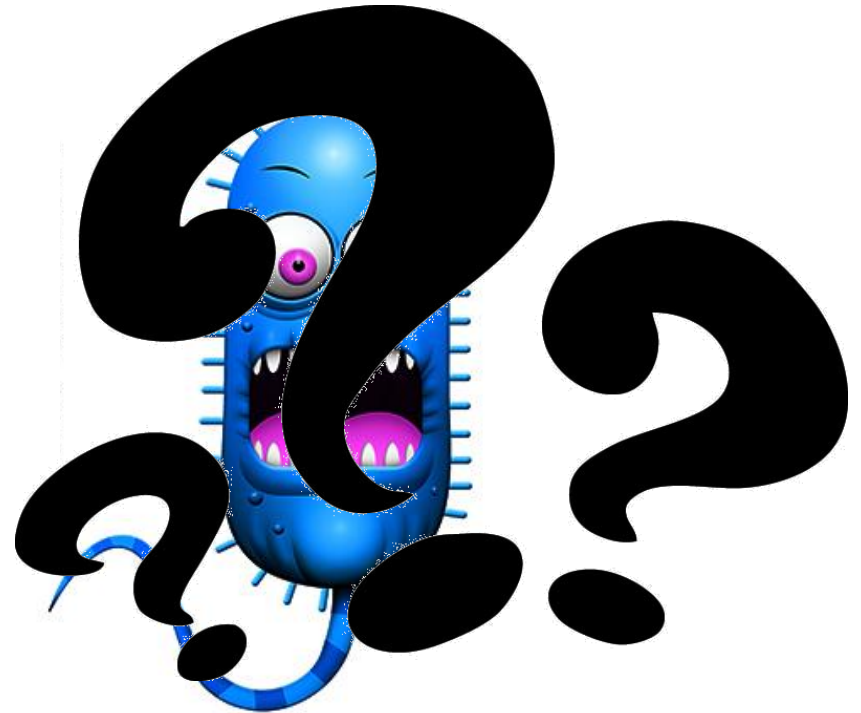
19-01-2015

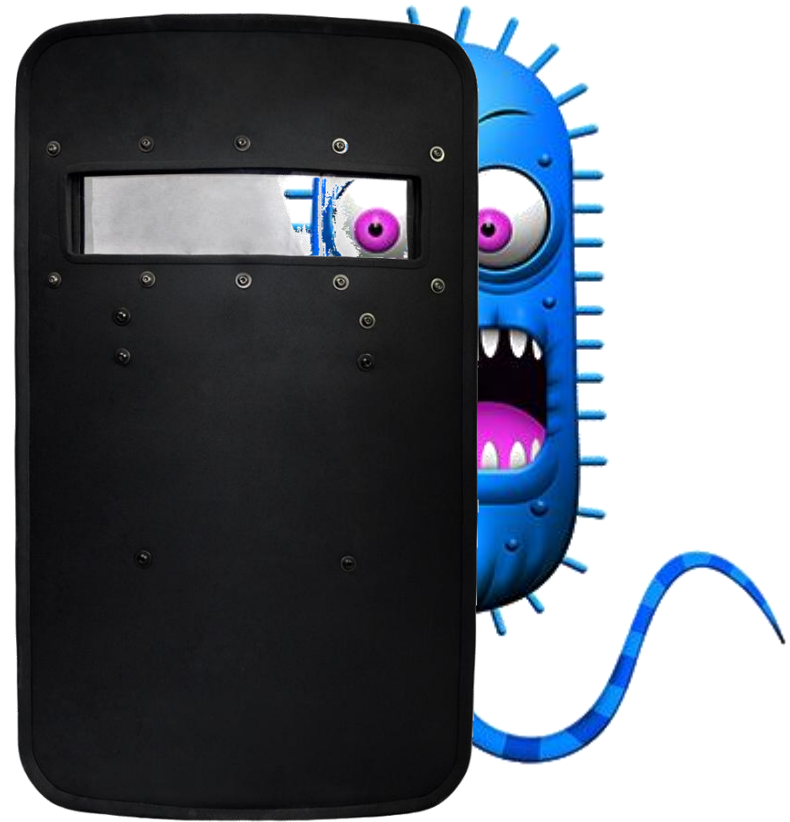




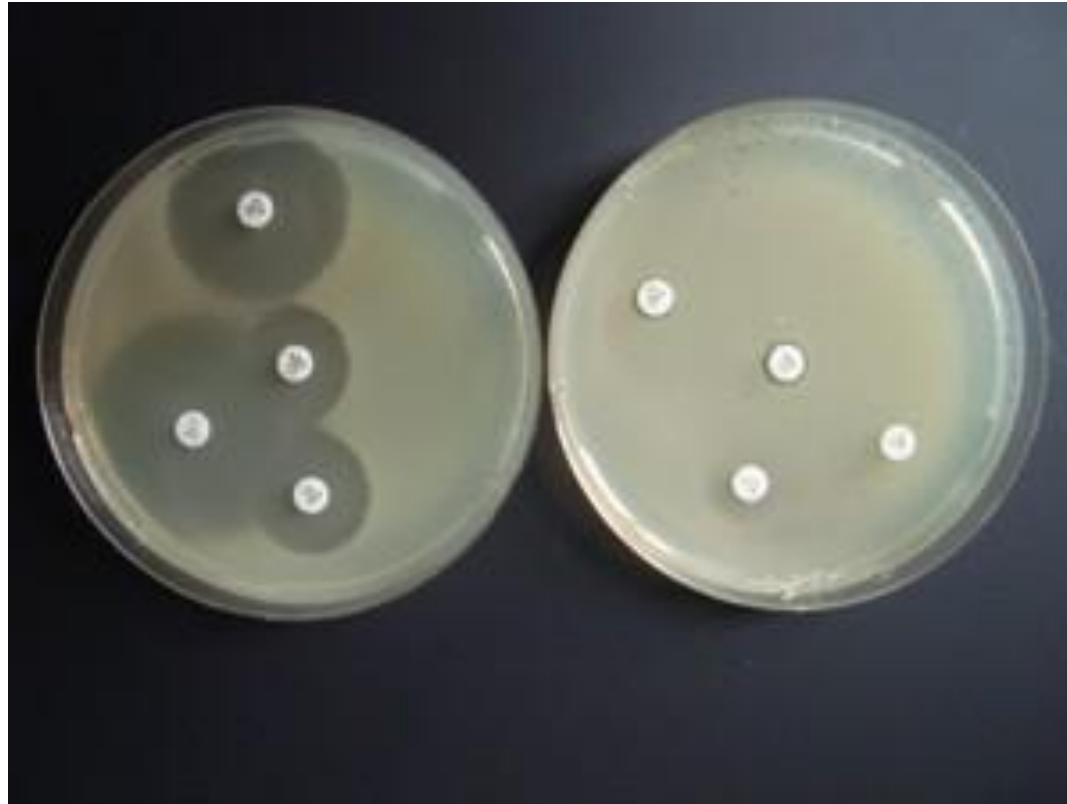
Het kan meer dan 3 dagen duren voor het laboratorium het antwoord vindt







Antibioticaresistentie



Geen bacteriën rond de
antibiotica

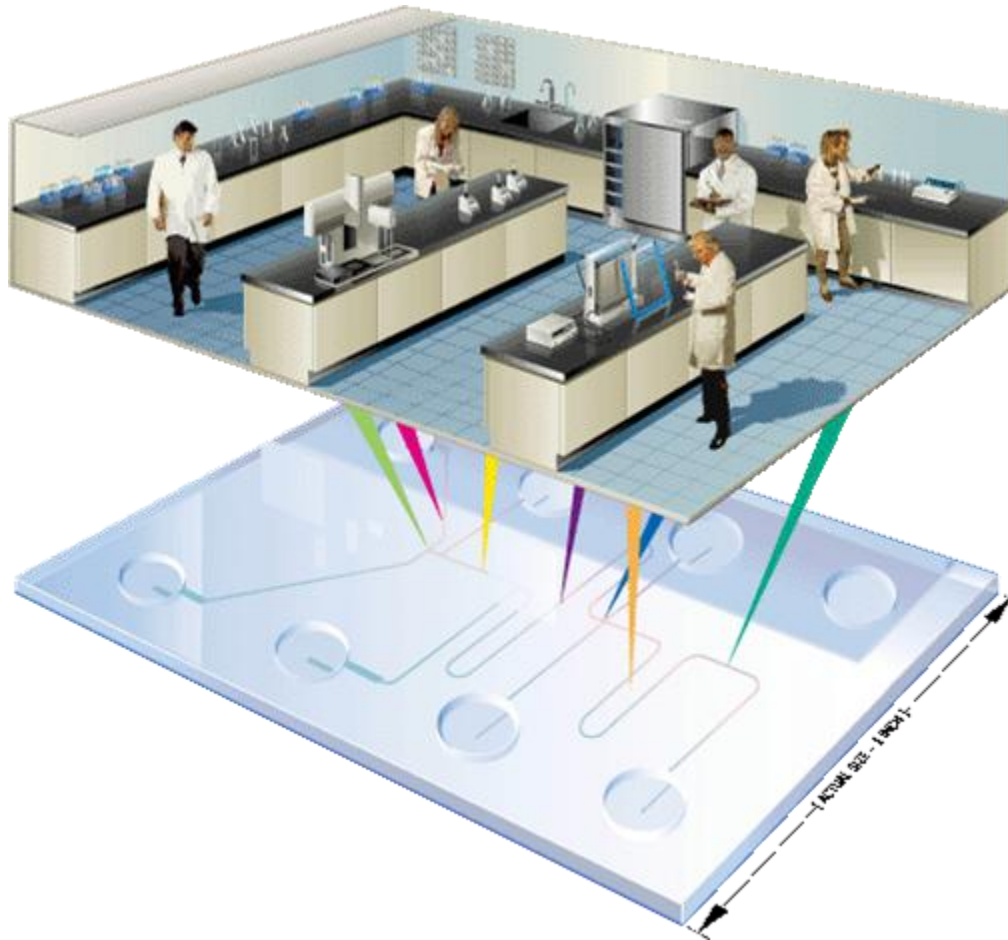
Antibioticaresistente
bacteriëren voelen niets

We gebruiken te veel
antibiotica!



Tijd voor een andere
aanpak!

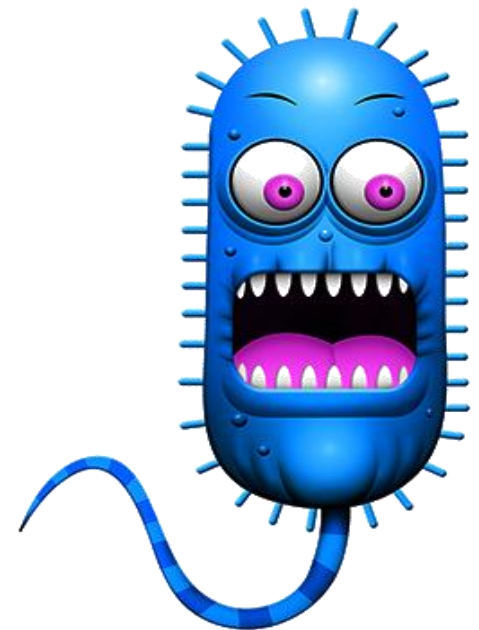
Lab-on-a-chip



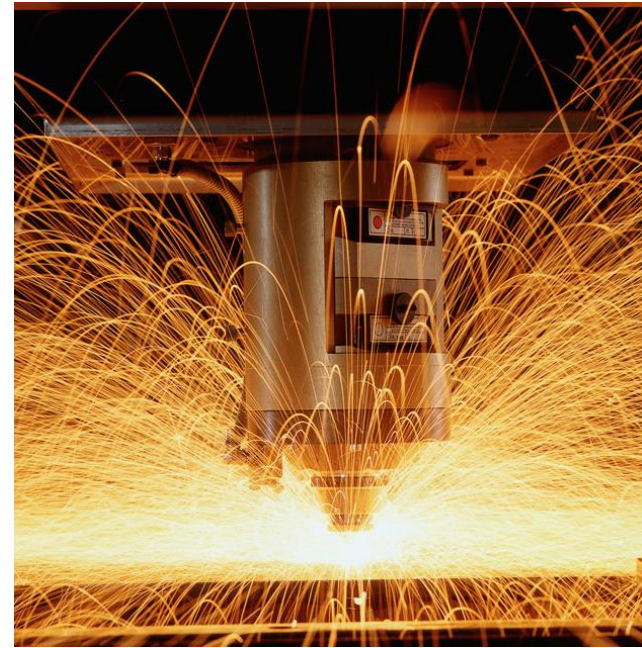
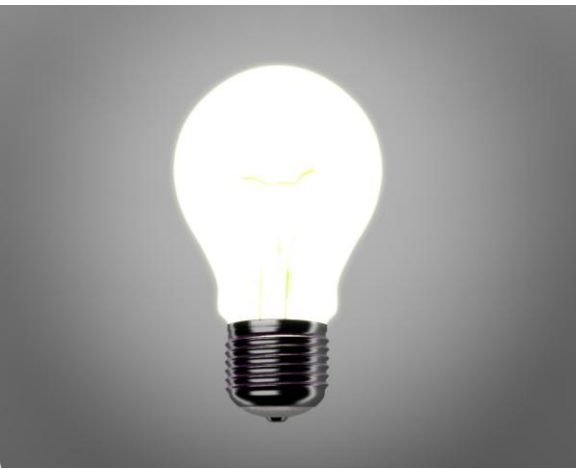
Uitleesmechanisme

Detectoren

Sample preparatie



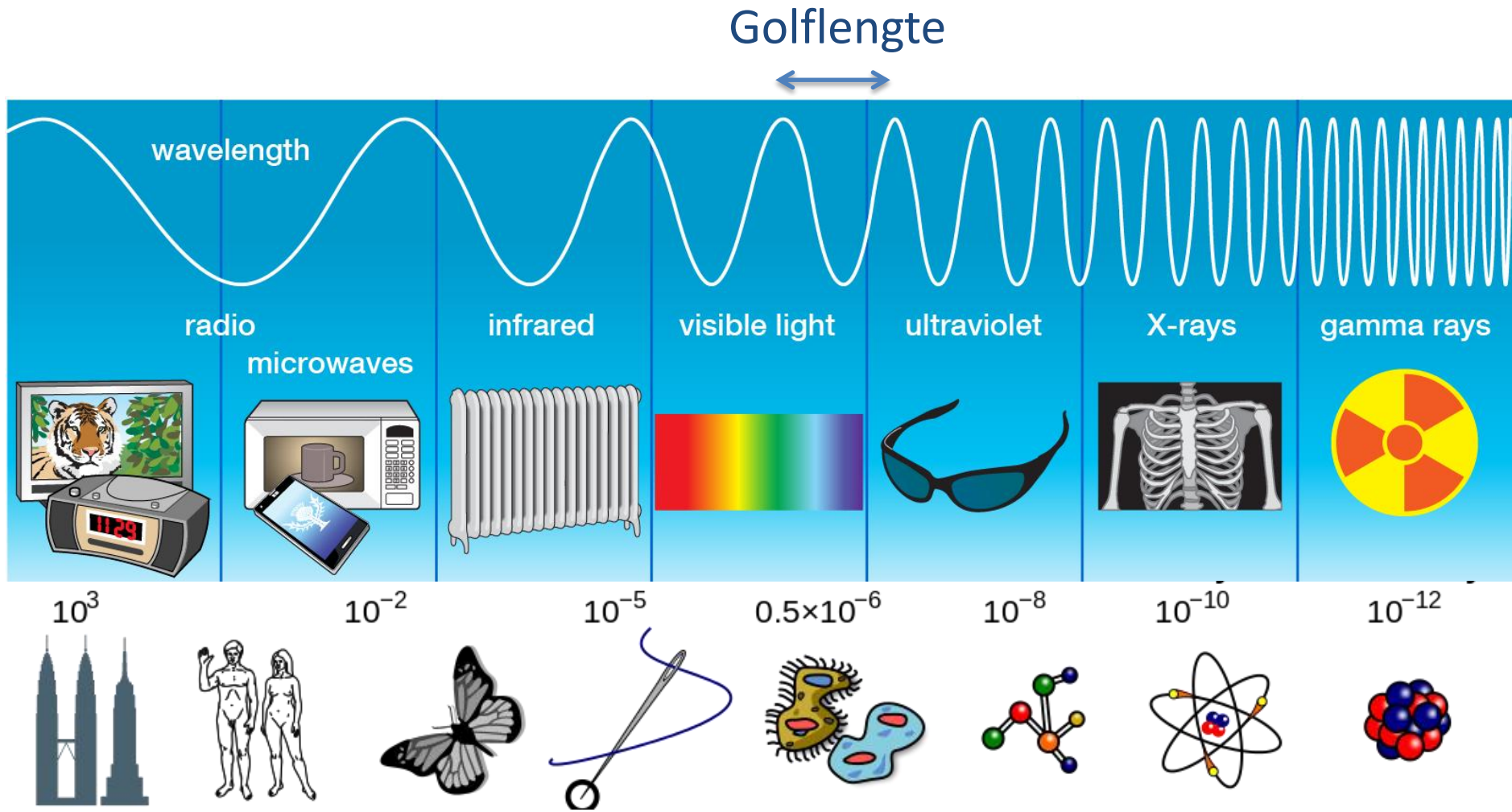
Optimalisaties van een biosensorplatform met ringresonatoren voor toepassingen in DNA-detectie



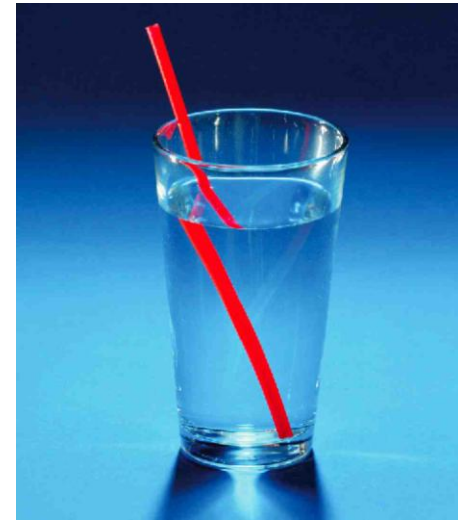
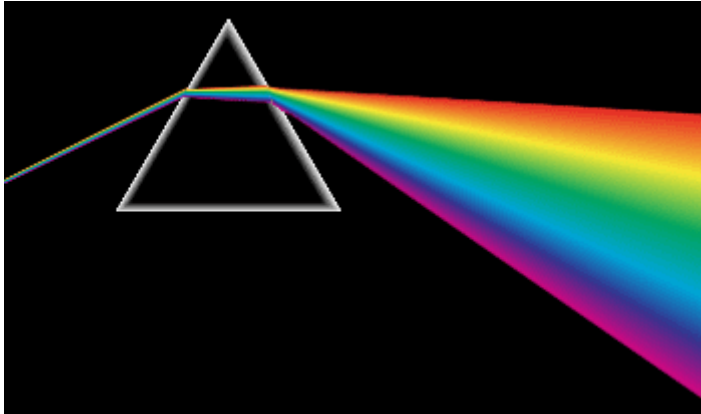
Fotonica



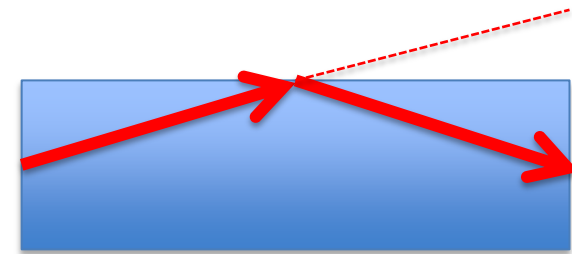
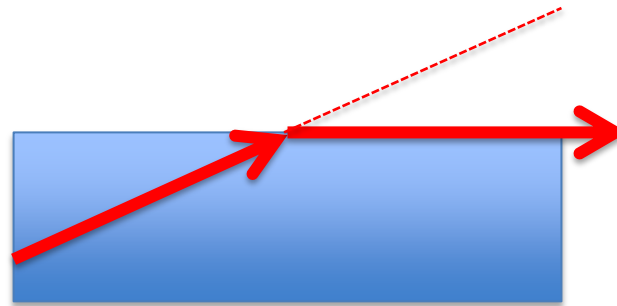
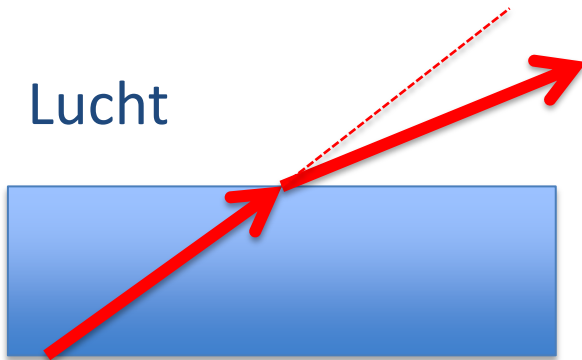
Licht is een elektromagnetische golf



Brekingindex

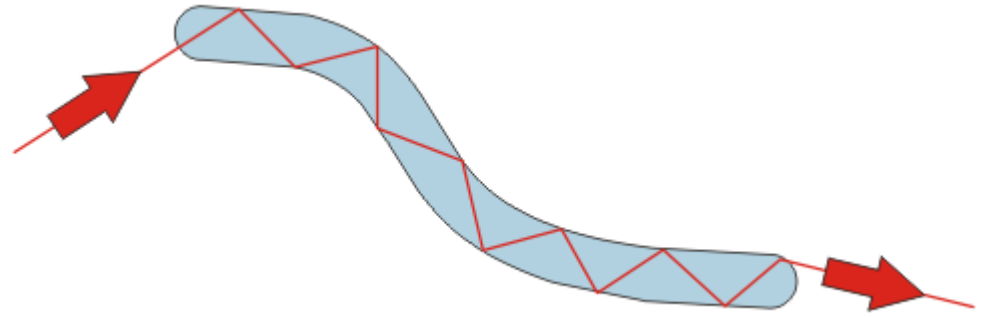


Lucht

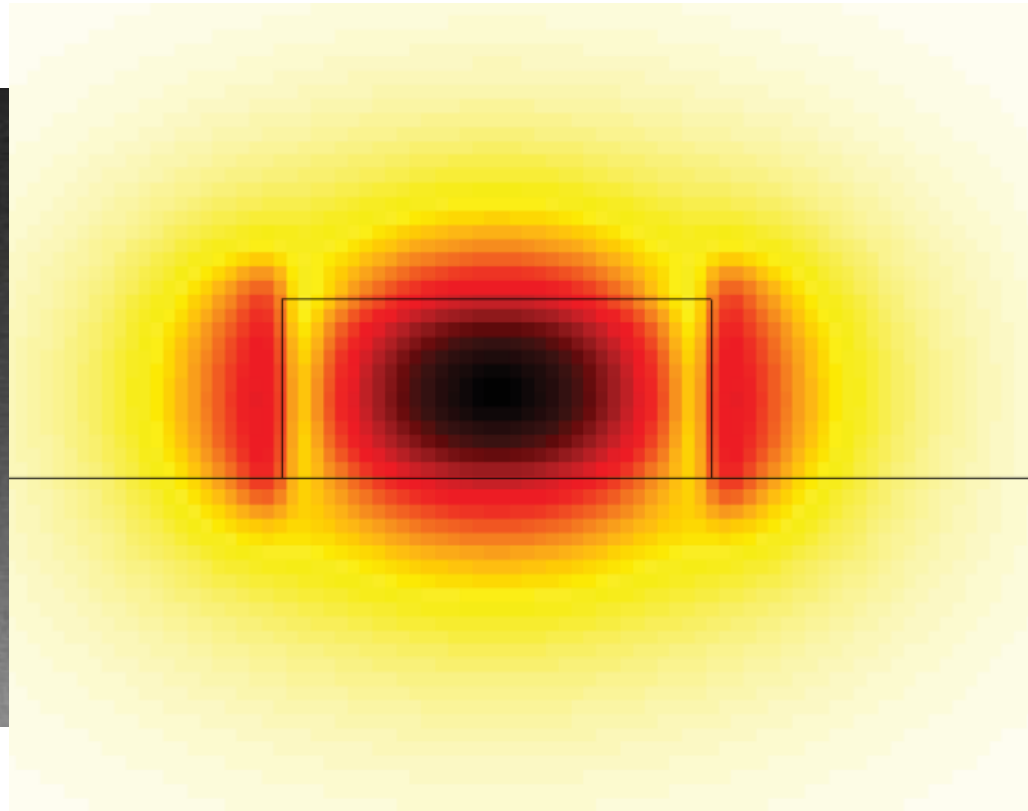
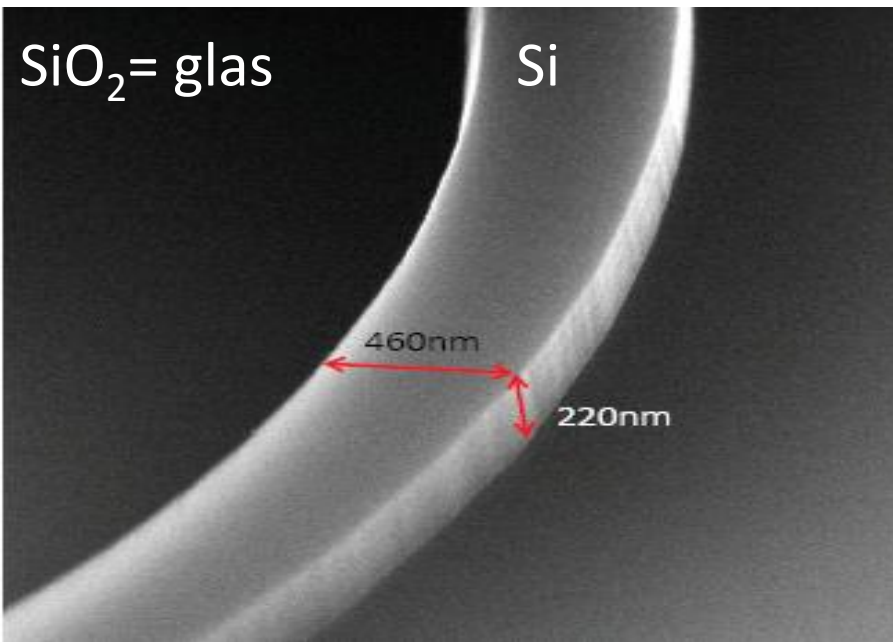


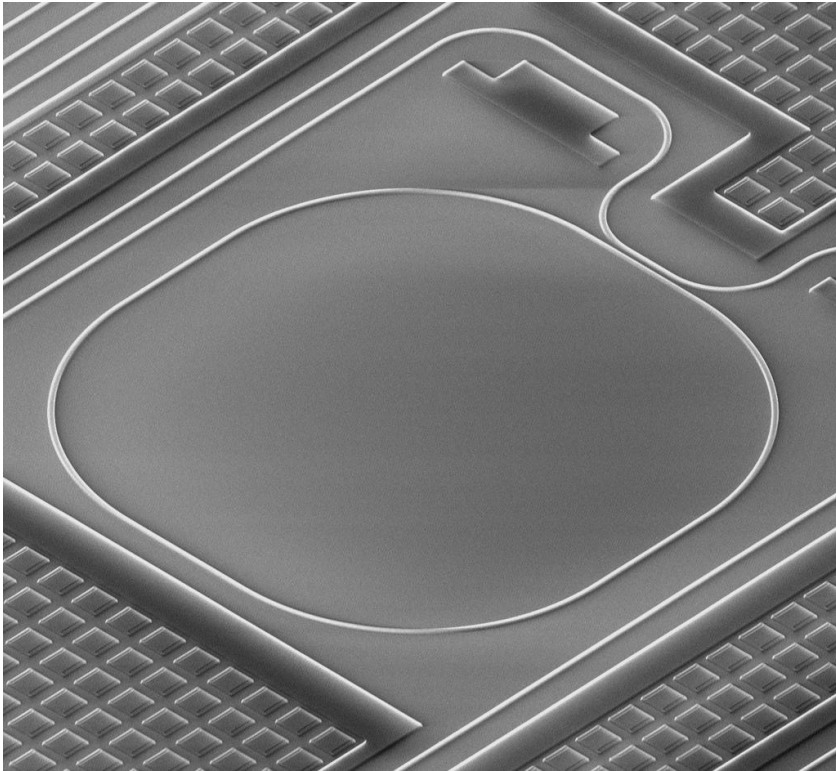
Glas

Golfgeleiders

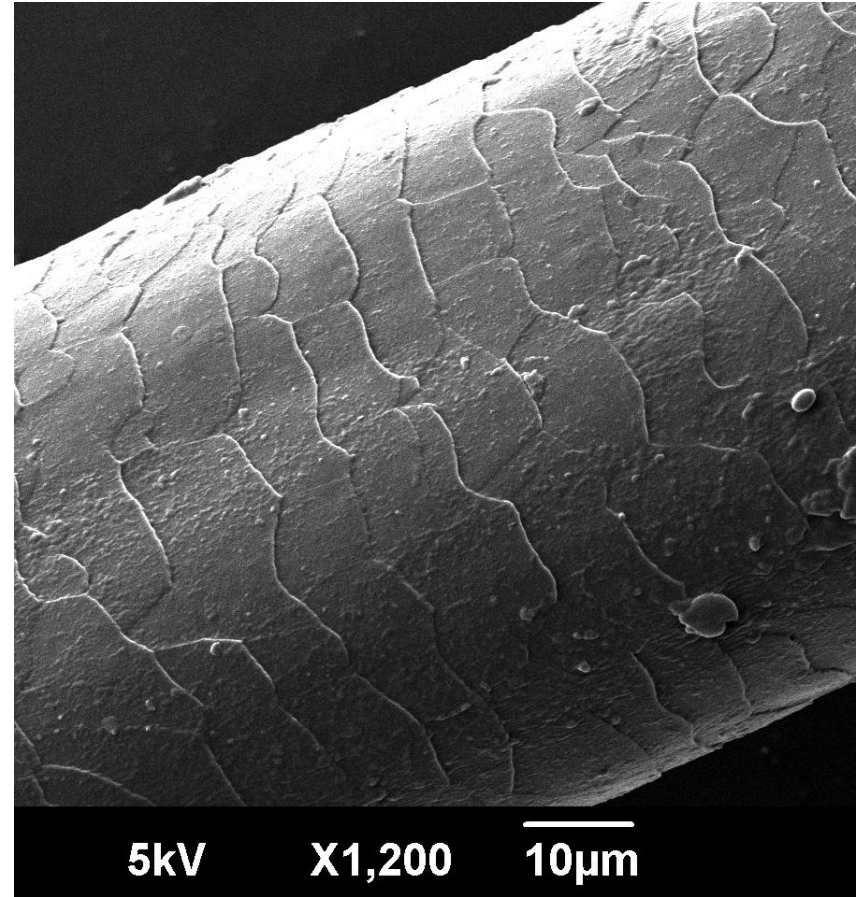


Geïntegreerde fotonica





microring resonator

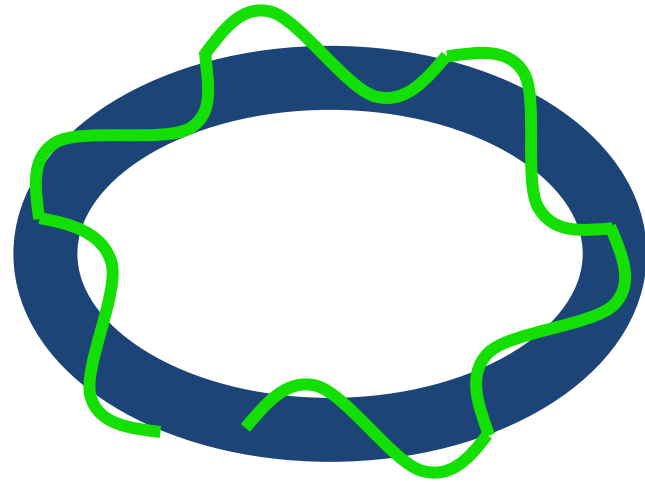


5kV

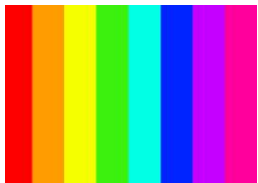
X1,200

10µm

Microring resonator



Wit licht



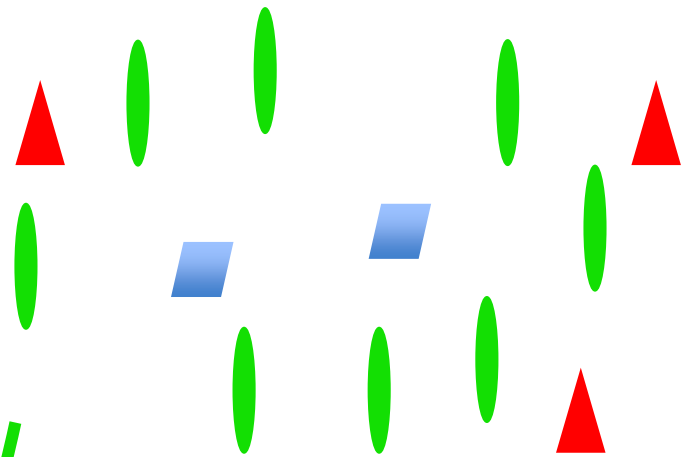
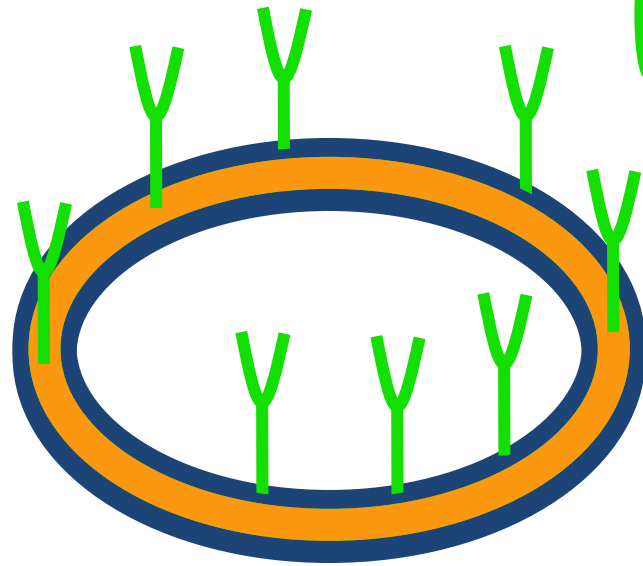
Ingang

Microring resonator

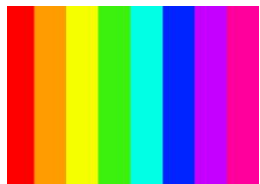


Optimalisaties van een biosensorplatform met ringresonatoren voor toepassingen in DNA-detectie

biosensor



Wit licht

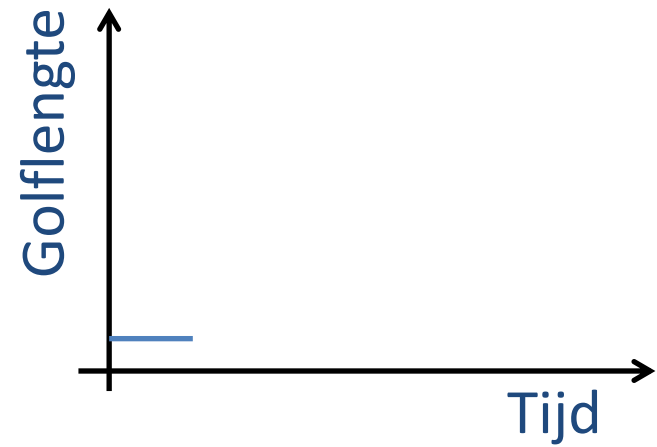
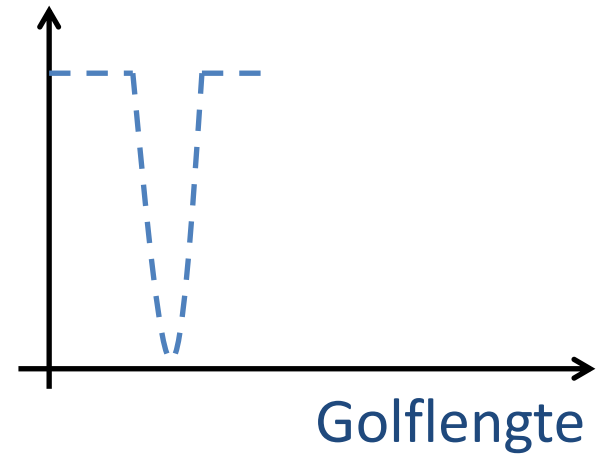
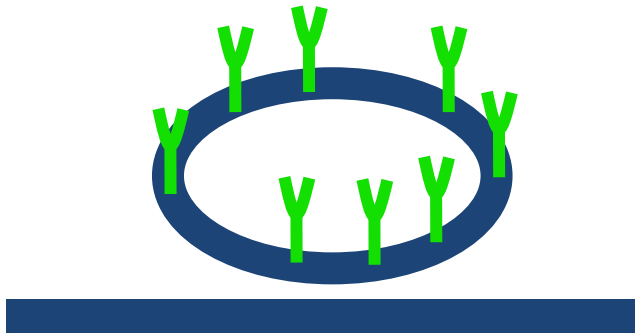


Ingang

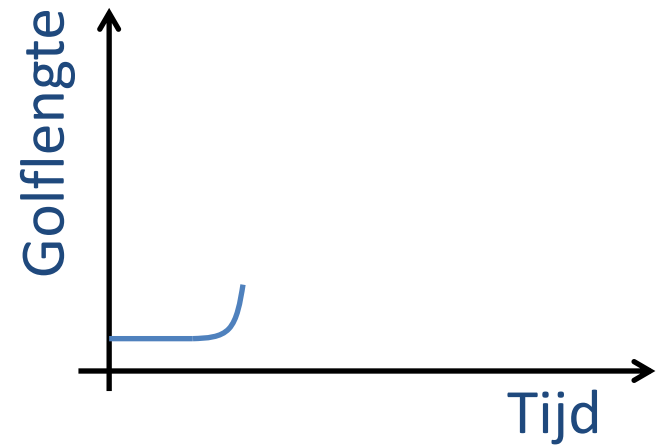
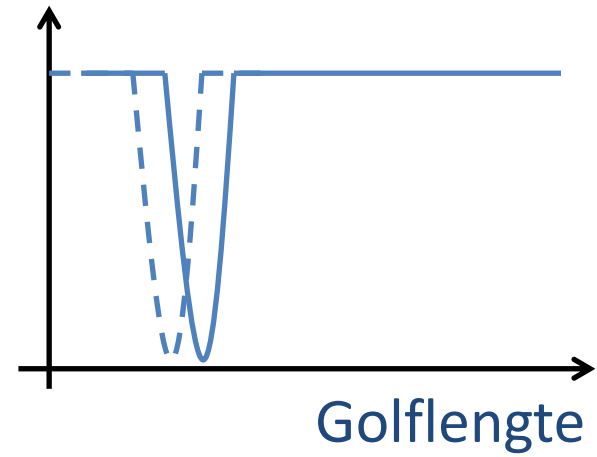
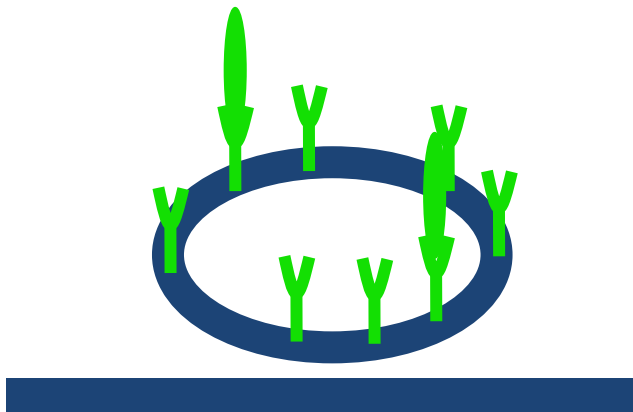


Uitgang

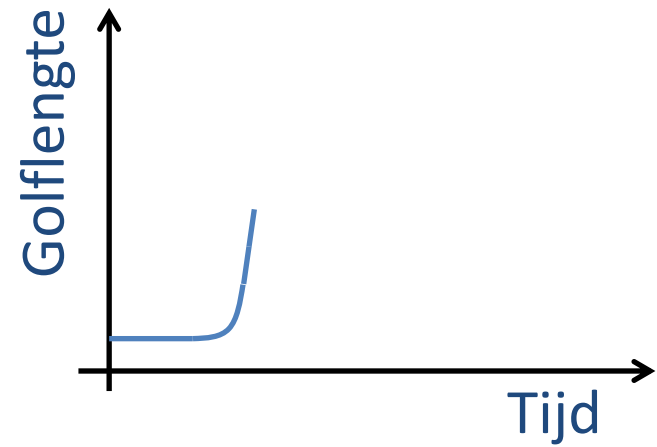
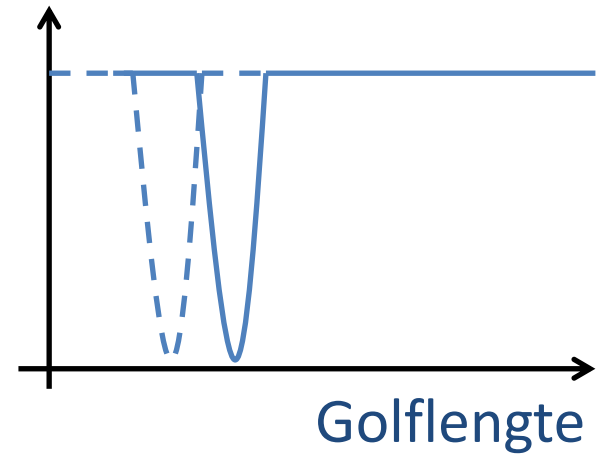
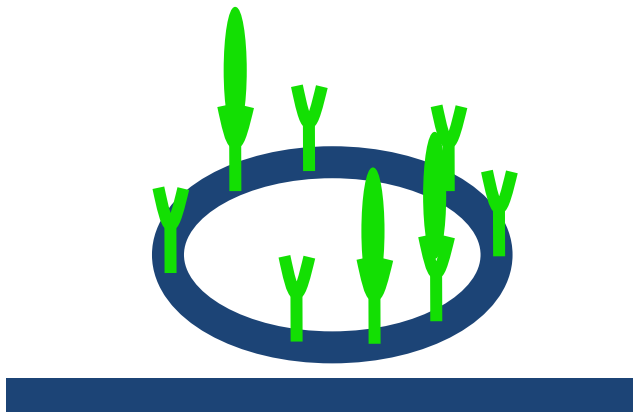
Bindingscurve



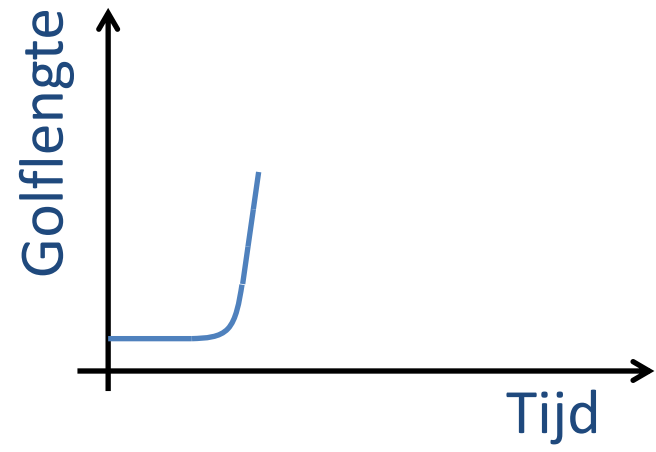
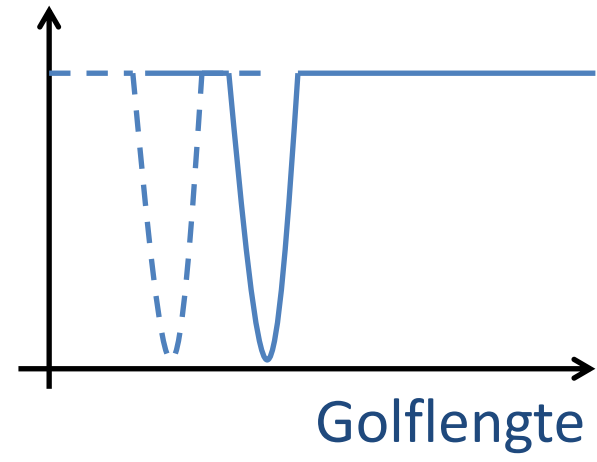
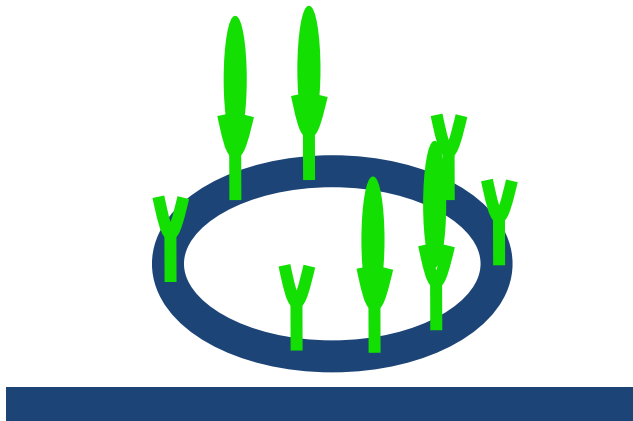
Bindingscurve



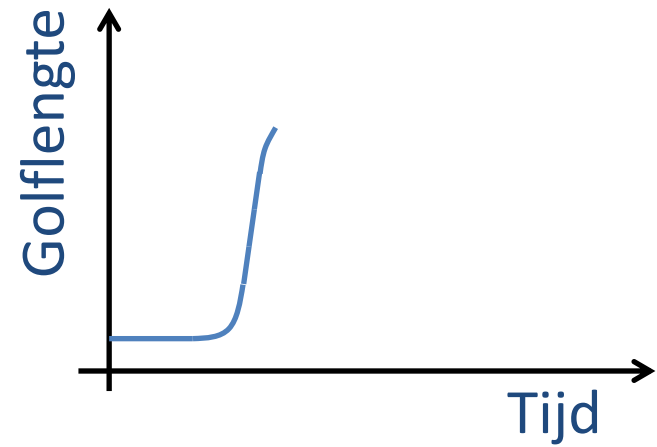
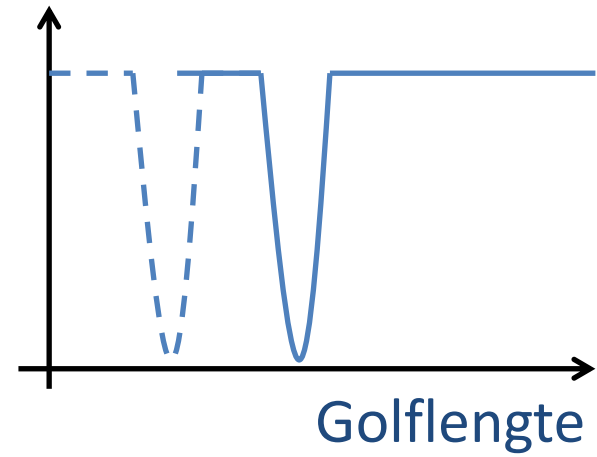
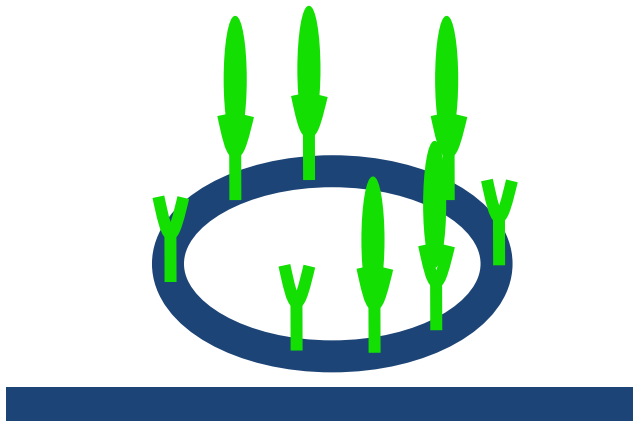
Bindingscurve



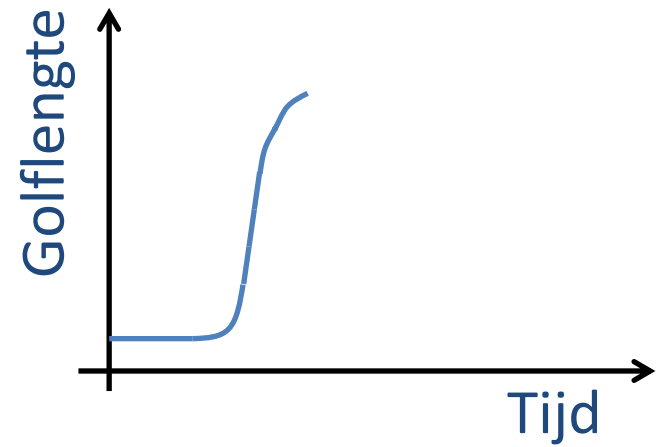
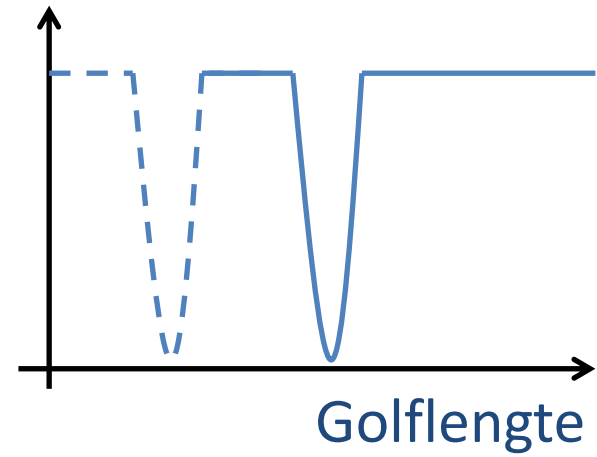
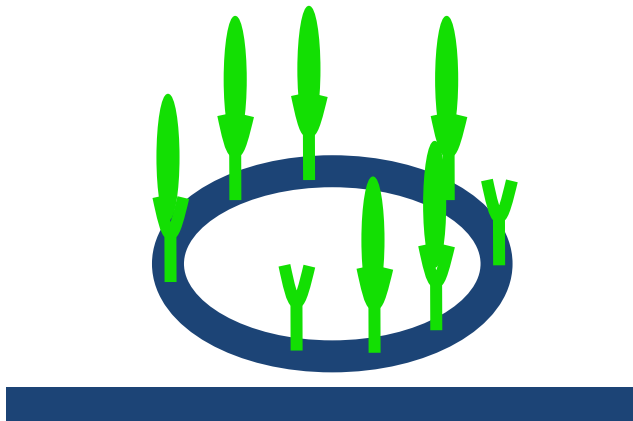
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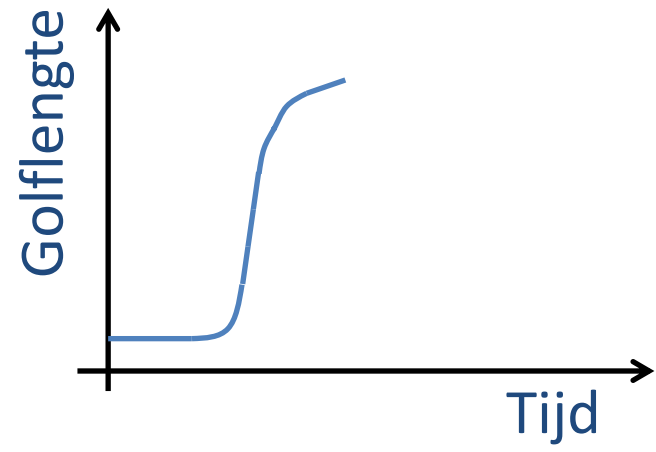
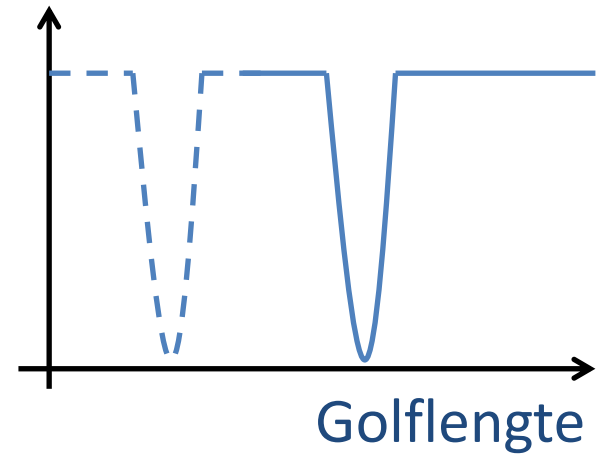
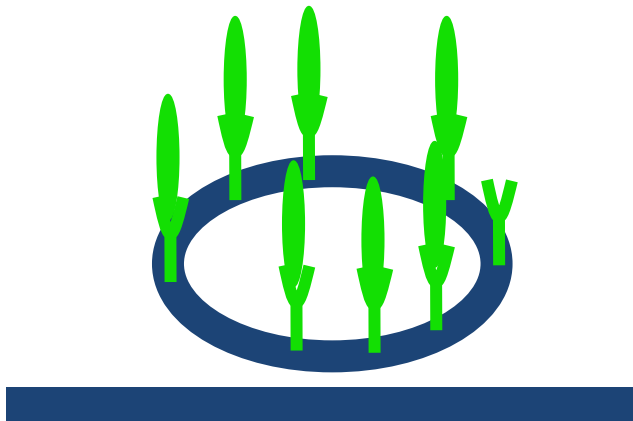
Bindingscurve



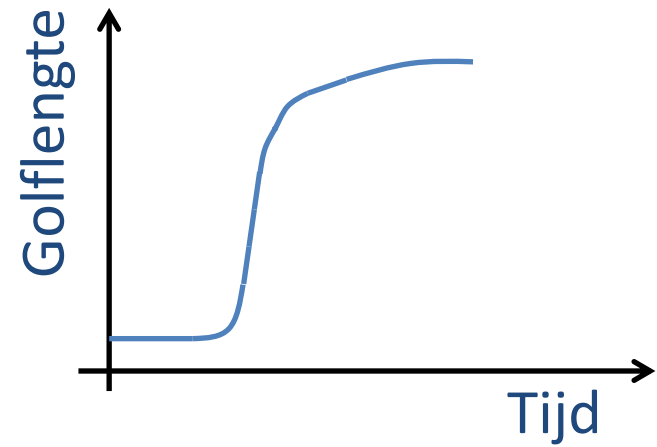
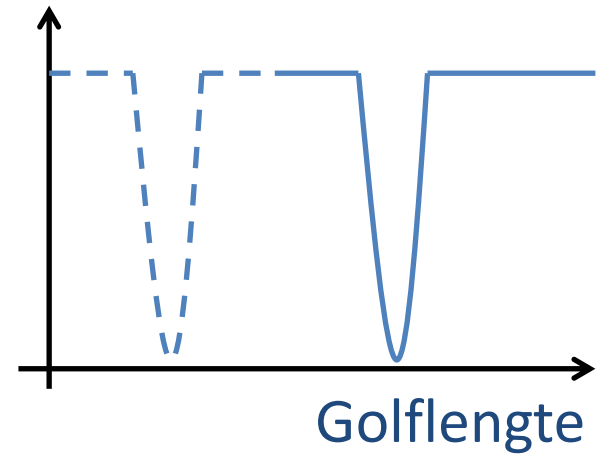
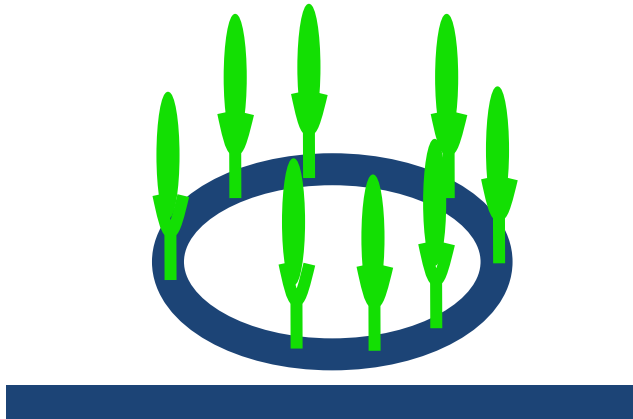
Bindingscurve

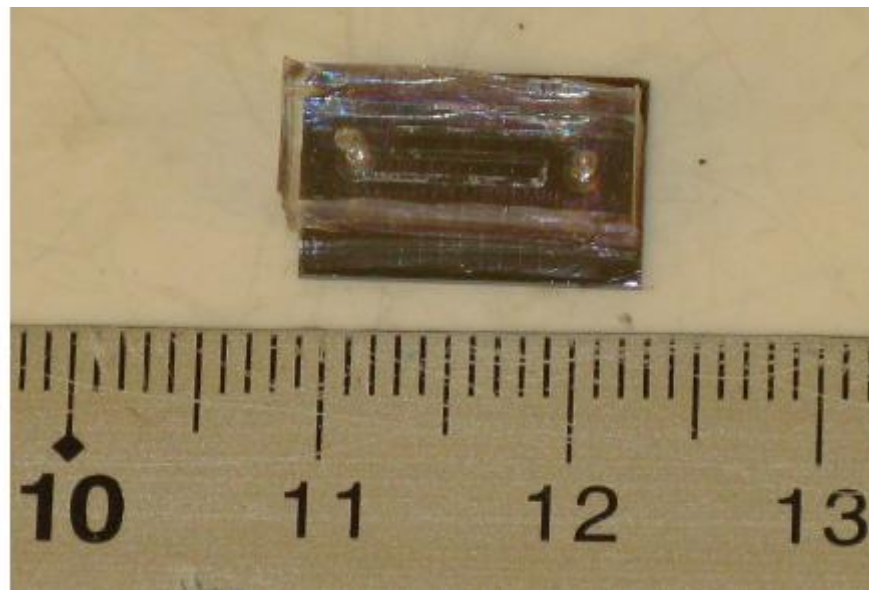
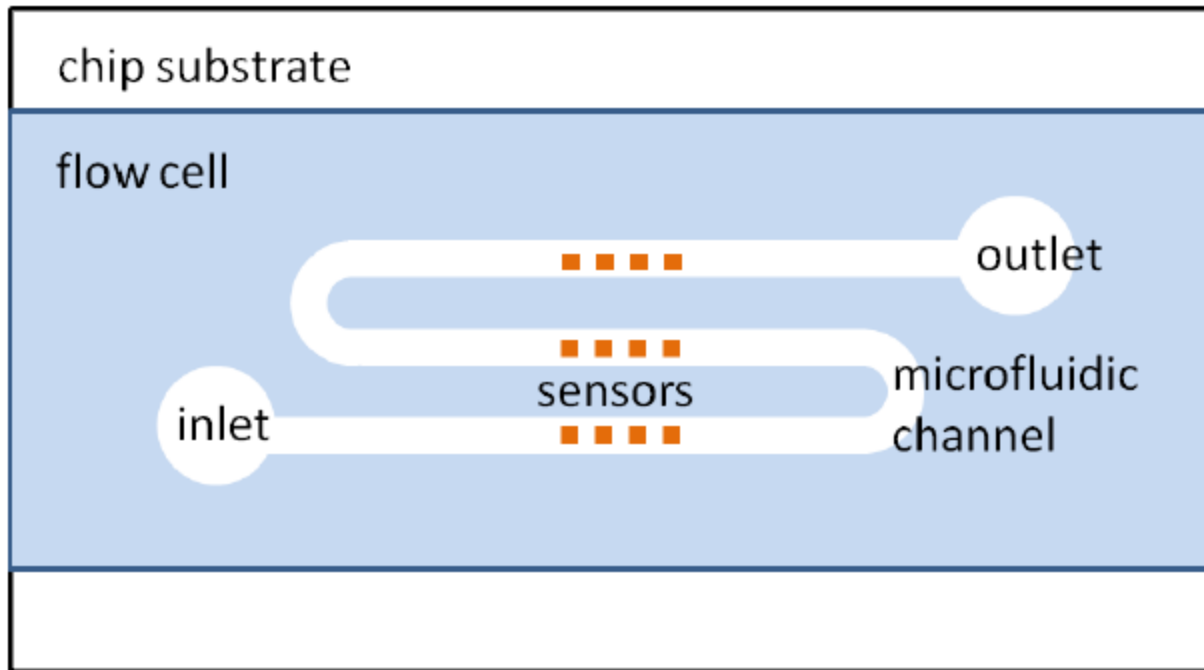


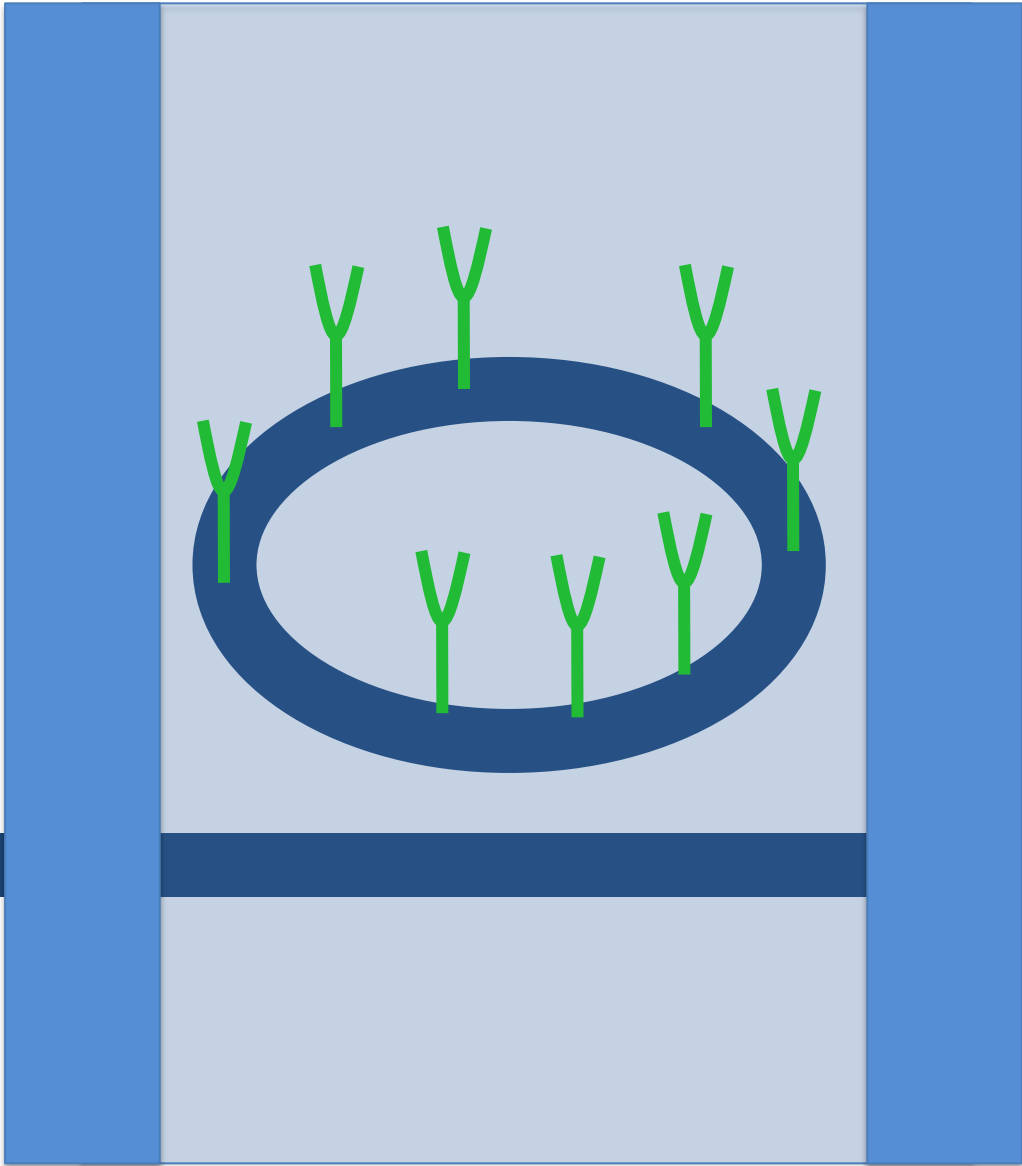
Bindingscurve



Bindingscurve

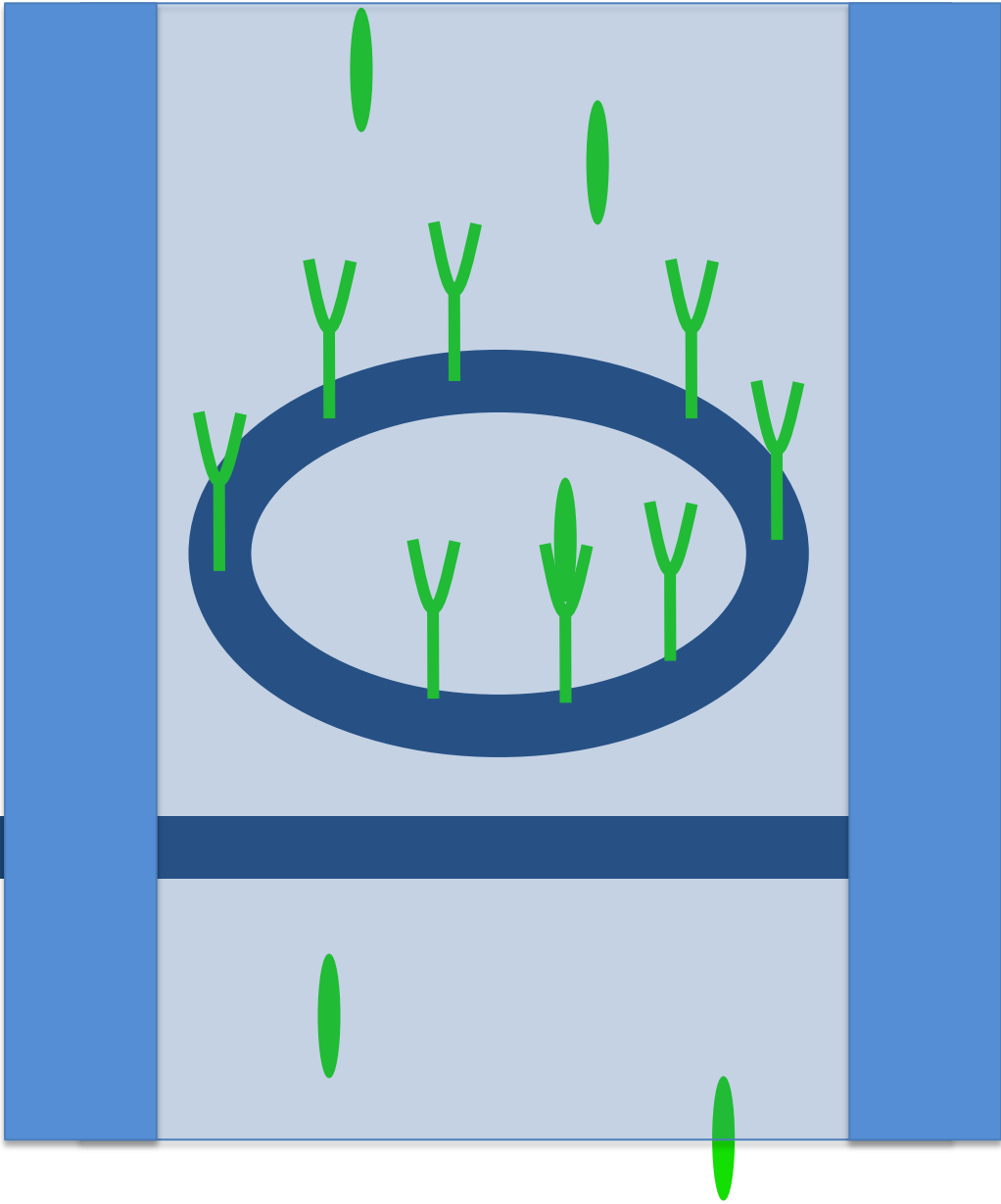






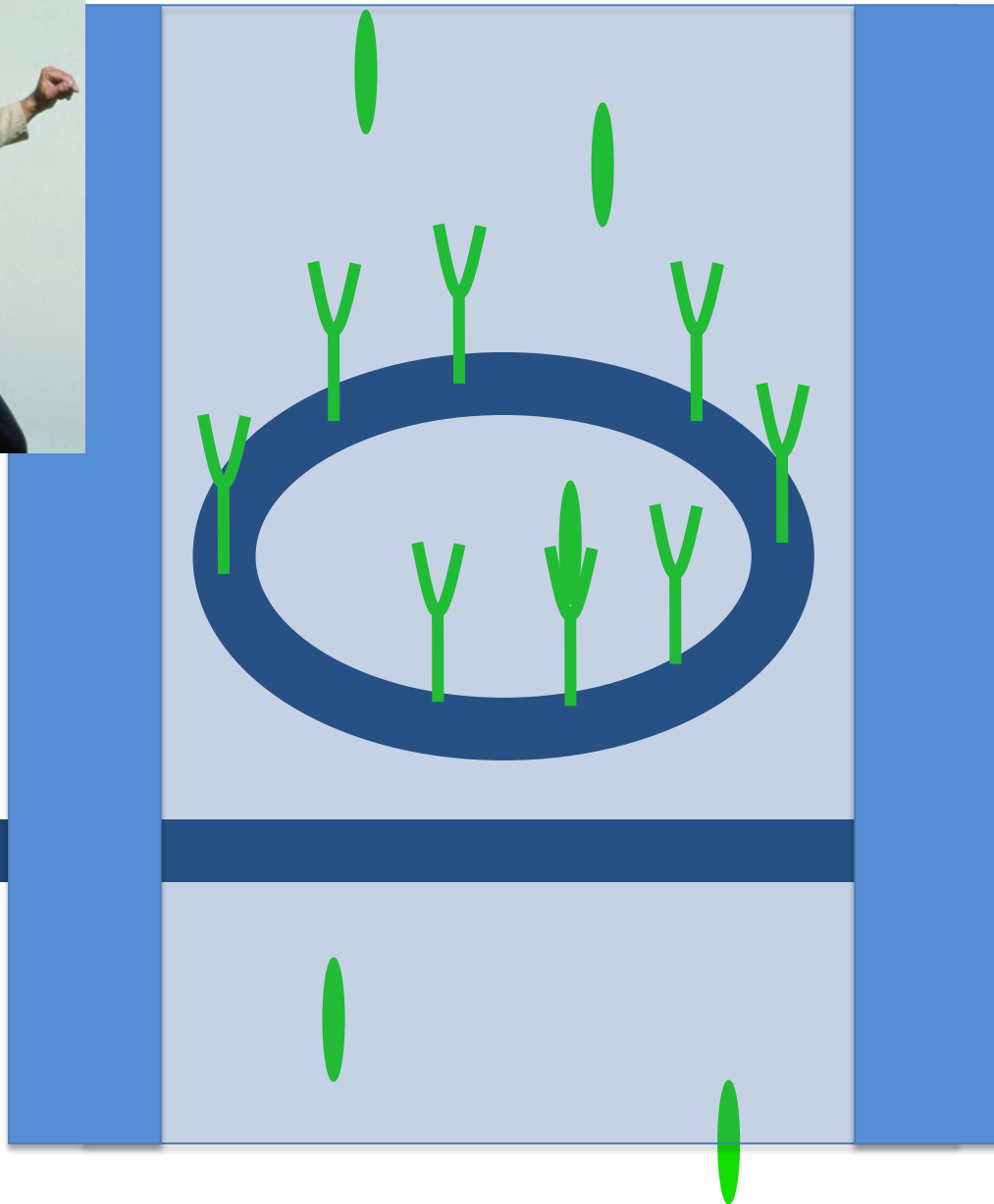
Ingang

Uitgang



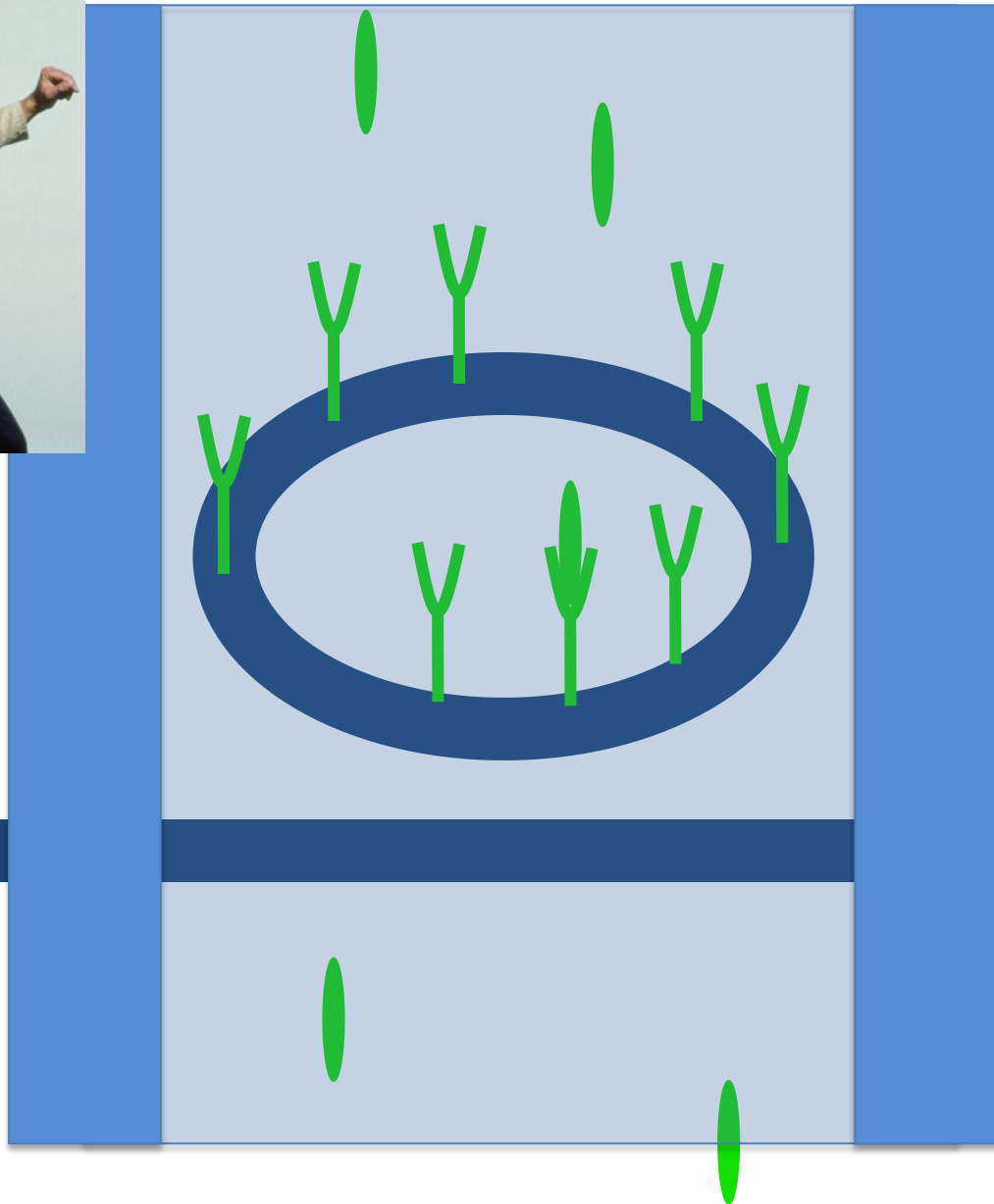
Ingang

Uitgang



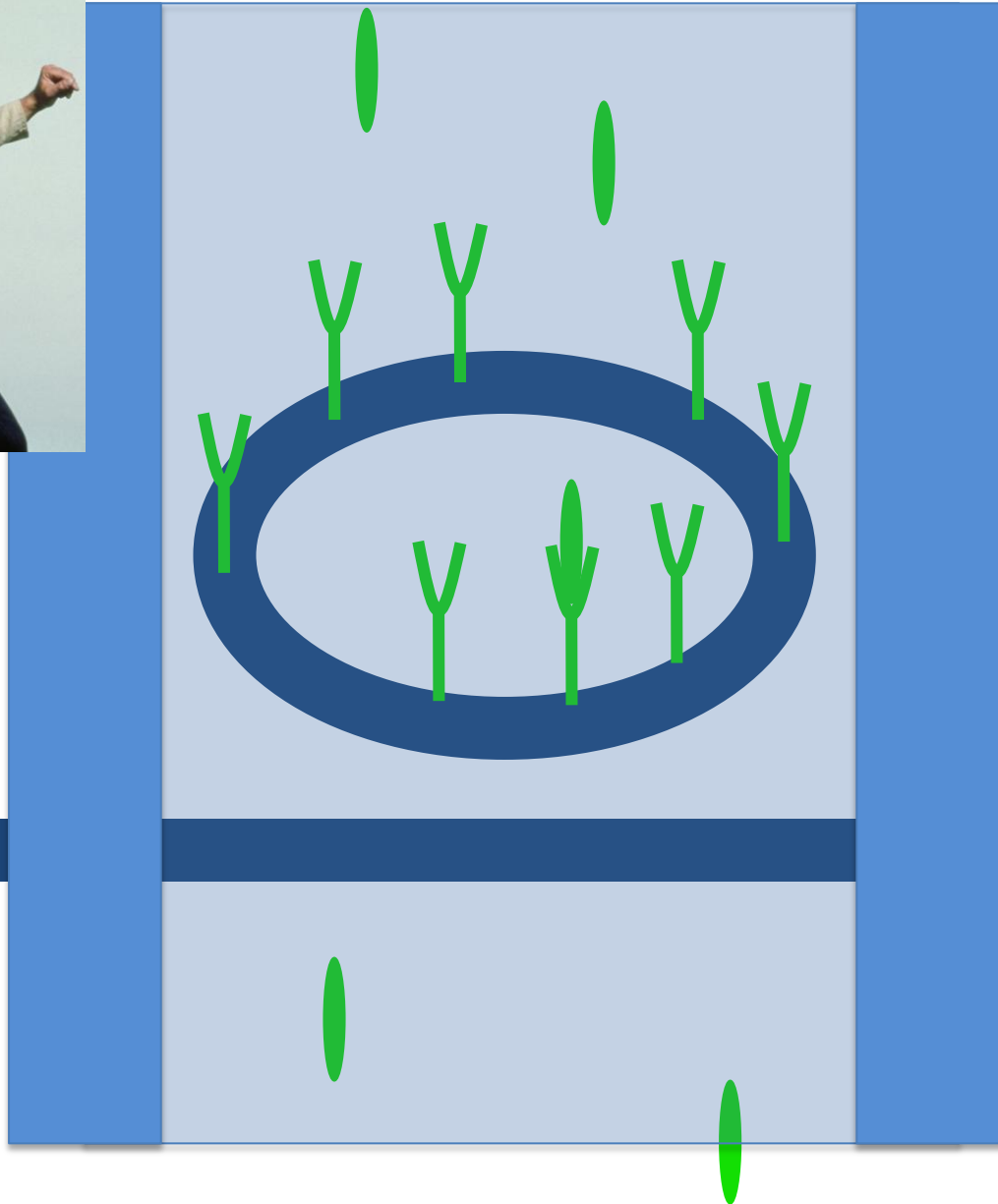
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Uitgang



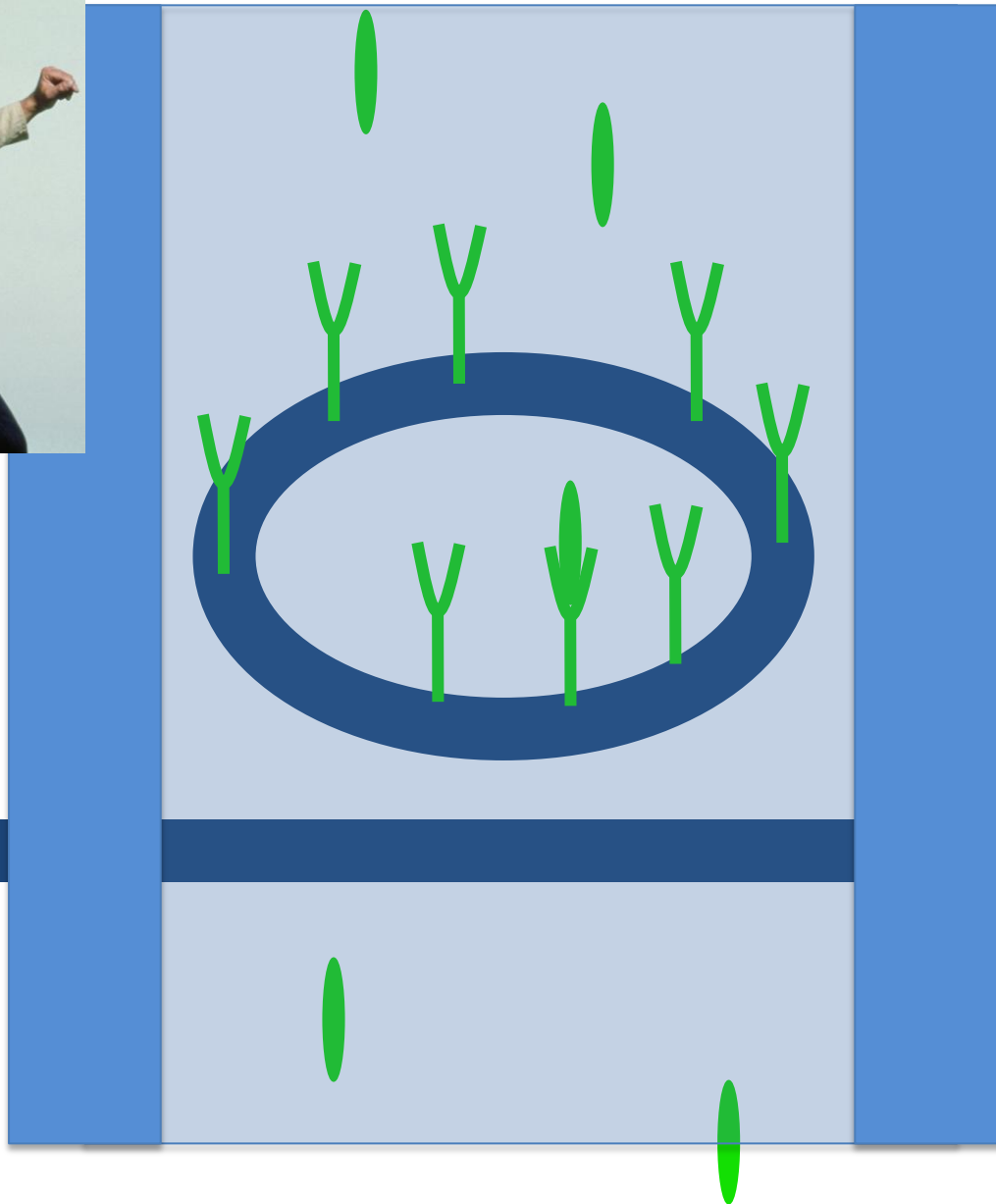
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Uitgang



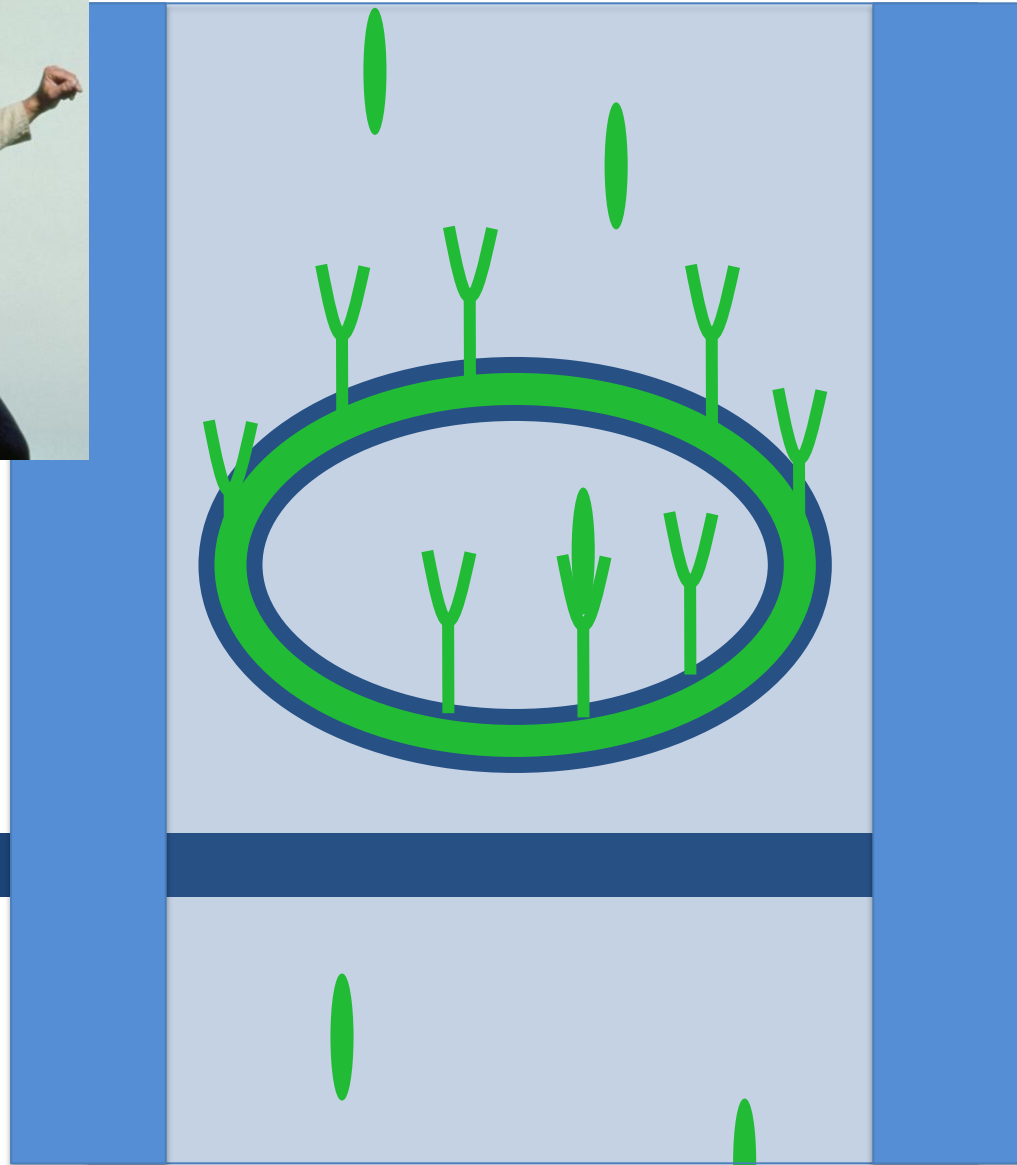
Uitgang

Ingang



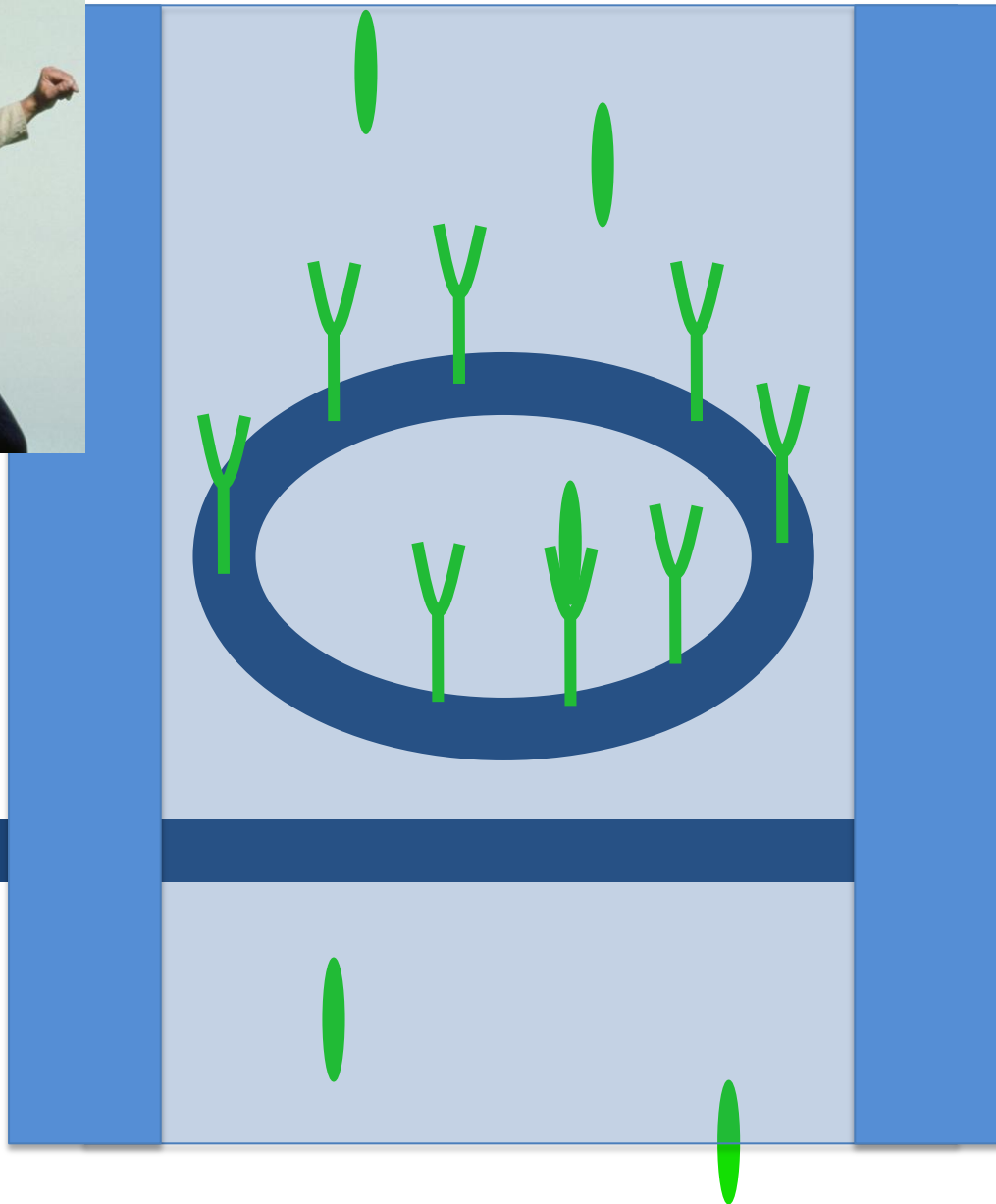
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Uitgang



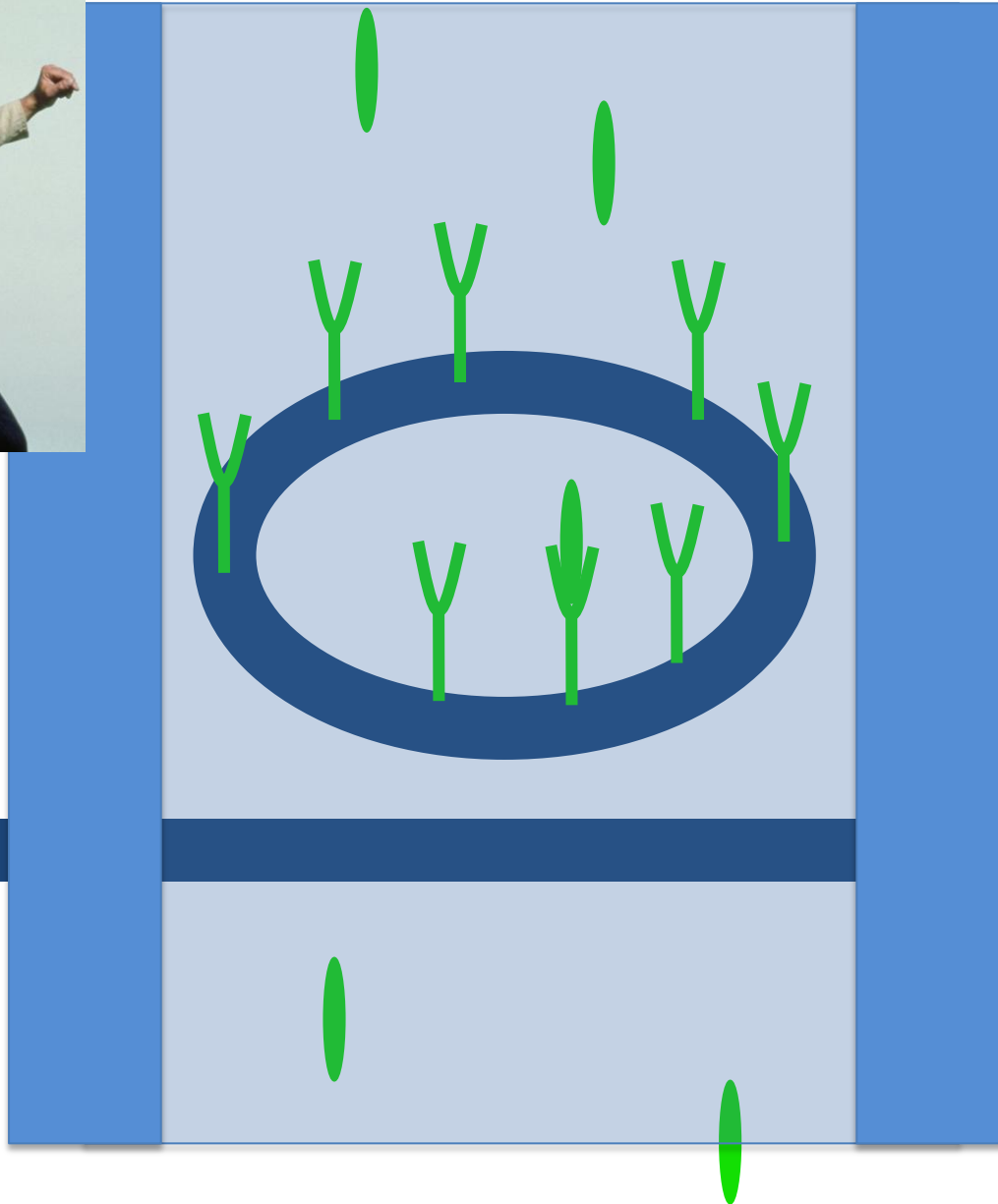
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Uitgang



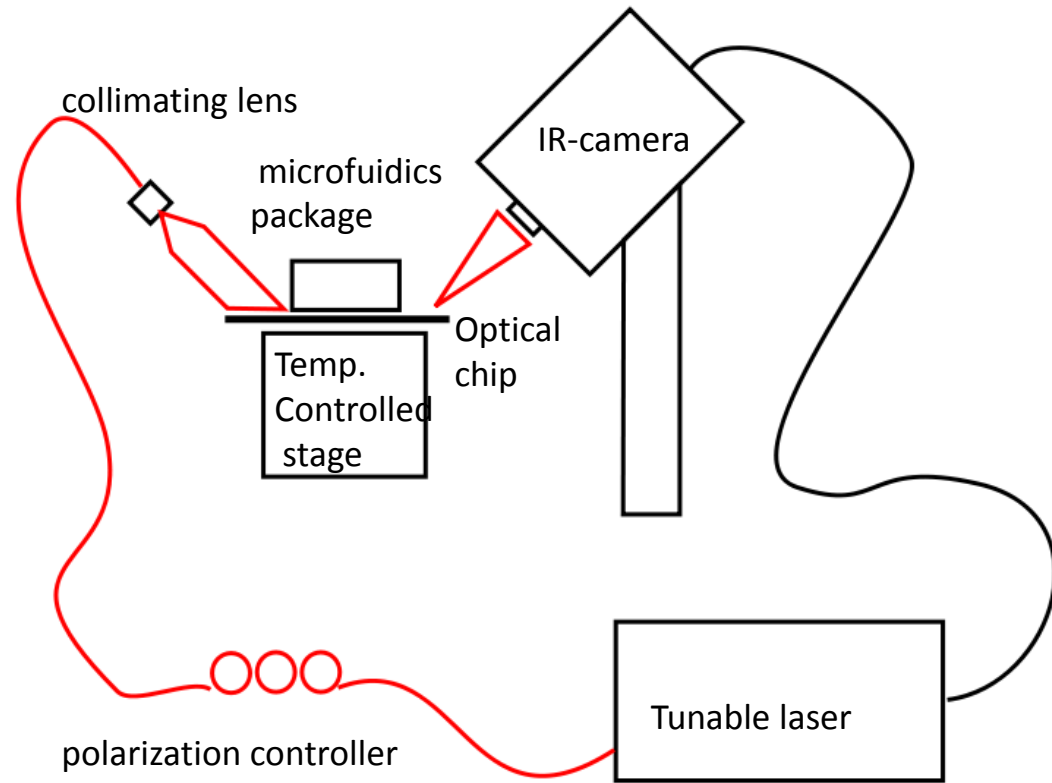
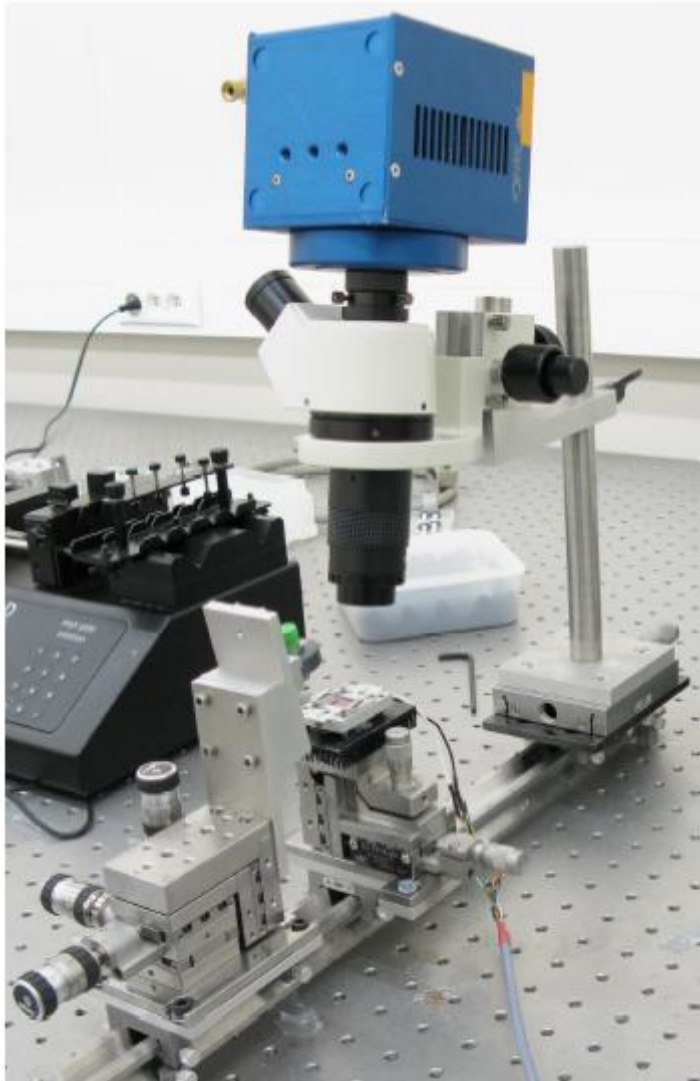
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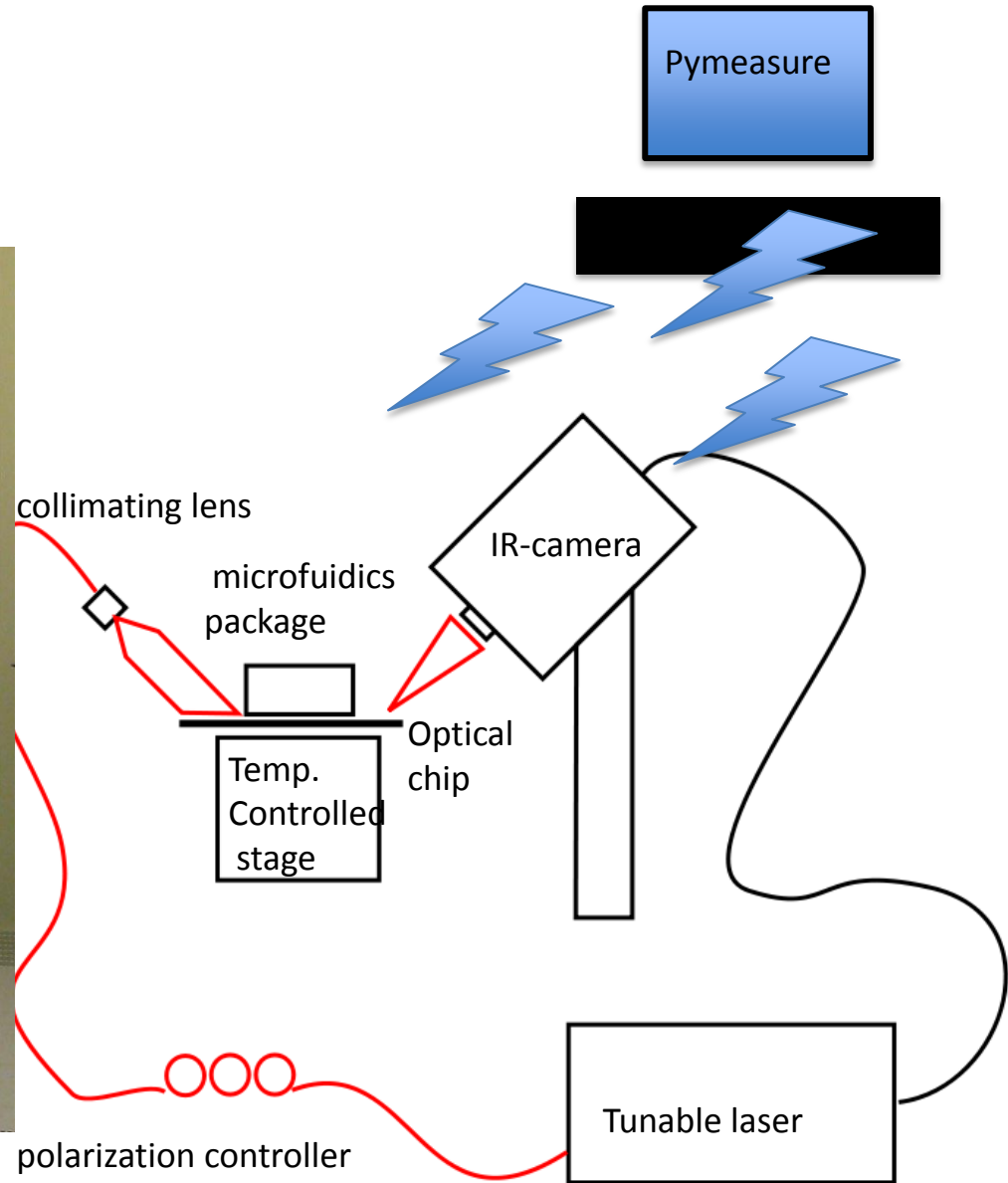
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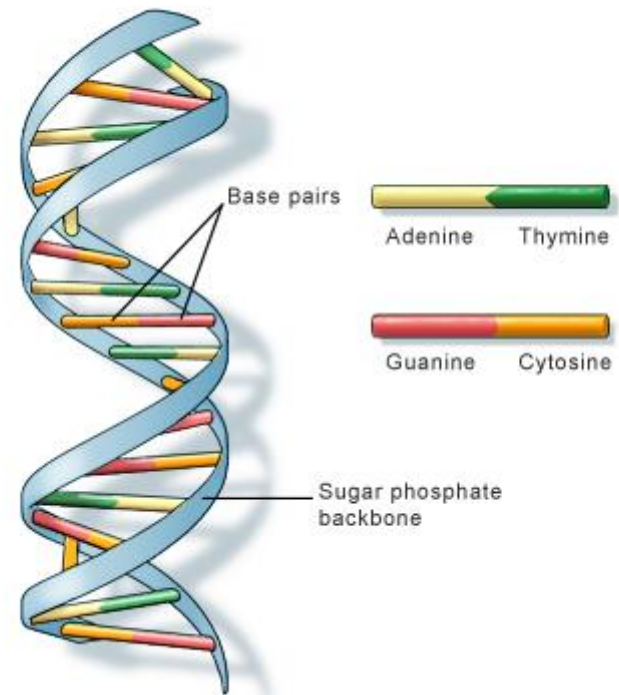
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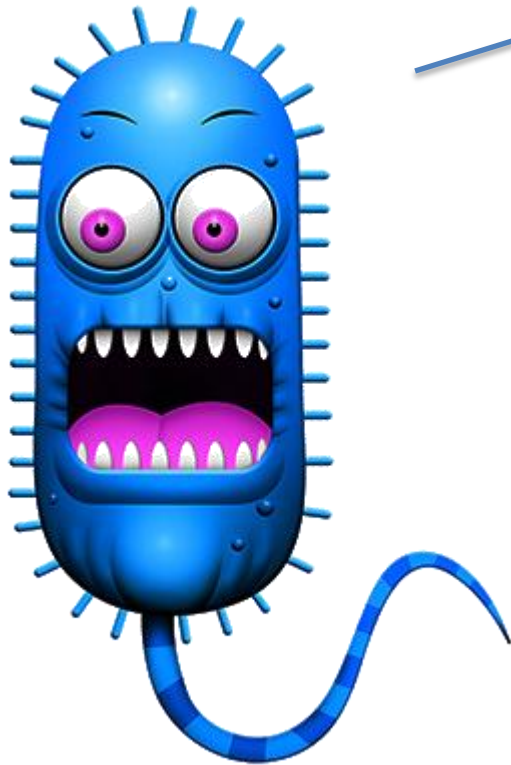
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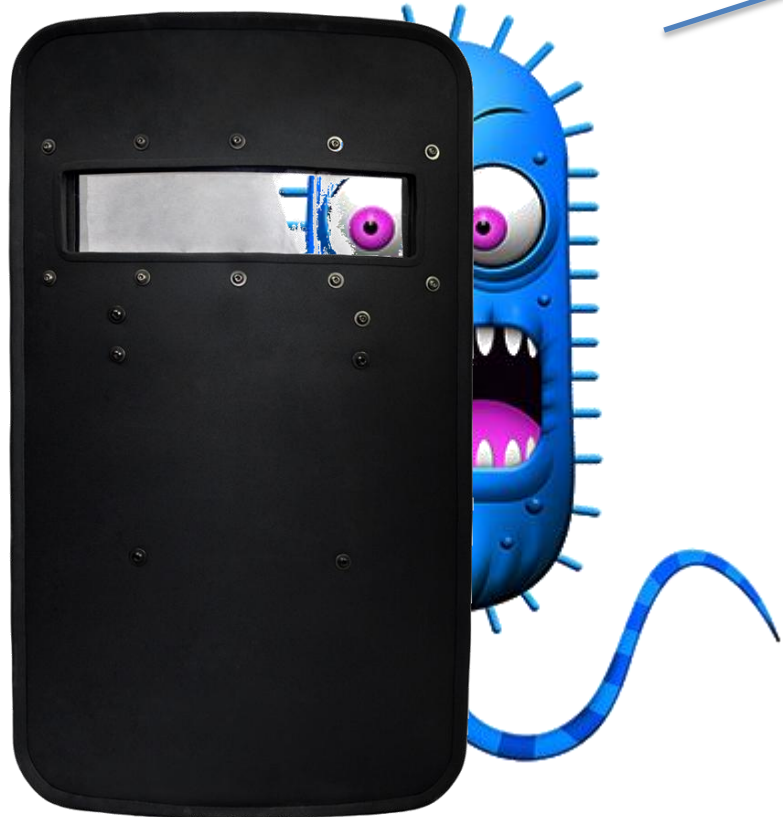


Optimalisaties van een biosensorplatform met ringresonatoren voor toepassingen in DNA-detectie





5'-CATGAGTC...CGCTT-3'
Kenmerk bacterie



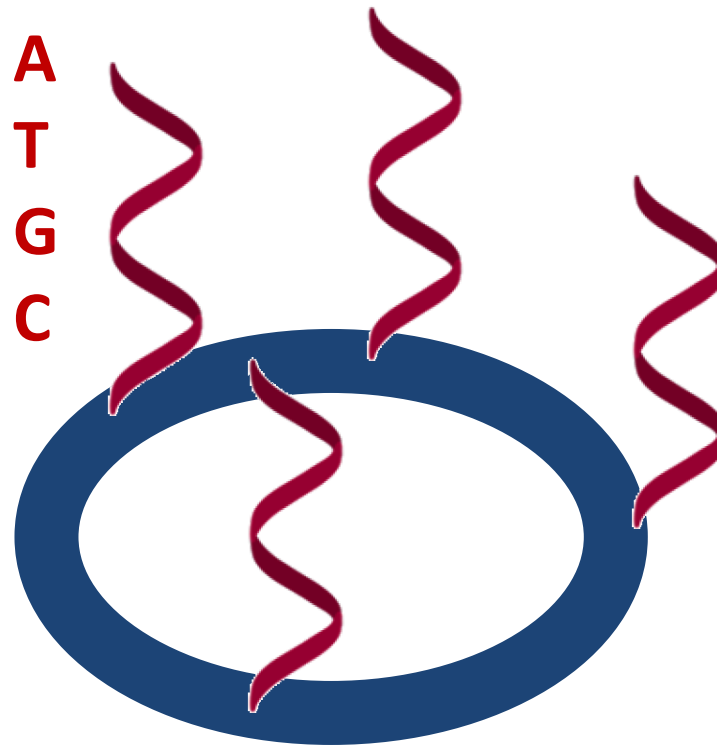
5'-CATGAGTC...CGCTT-3'
Kenmerk bacterie

5'-CGTAAGC...TGCCT-3'
Kenmerk resistentie

Ingang



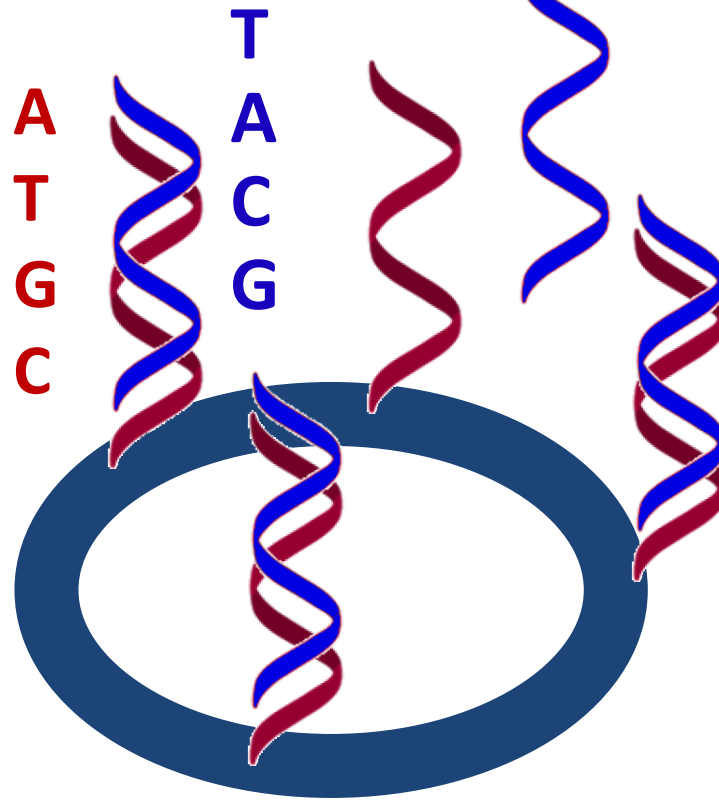
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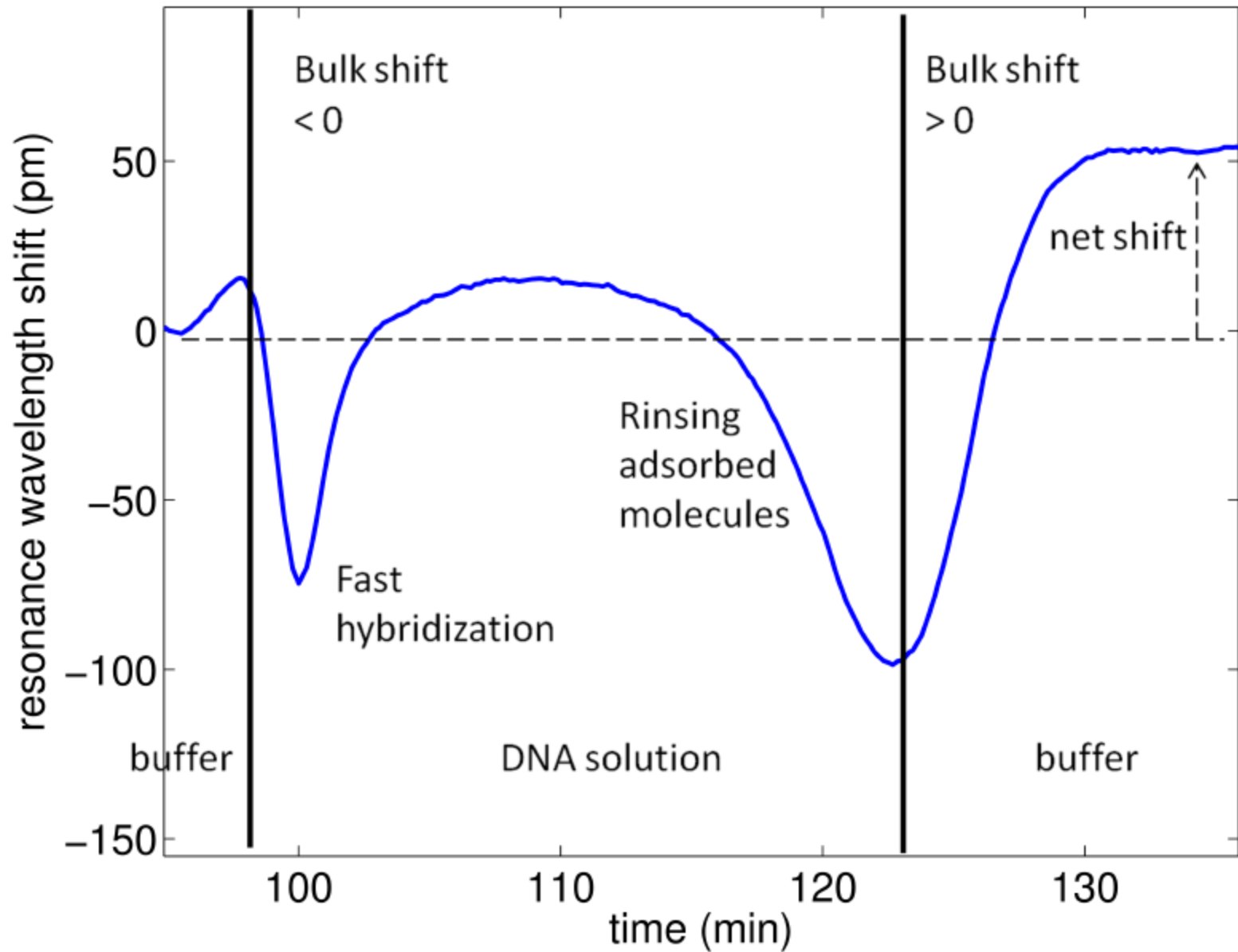


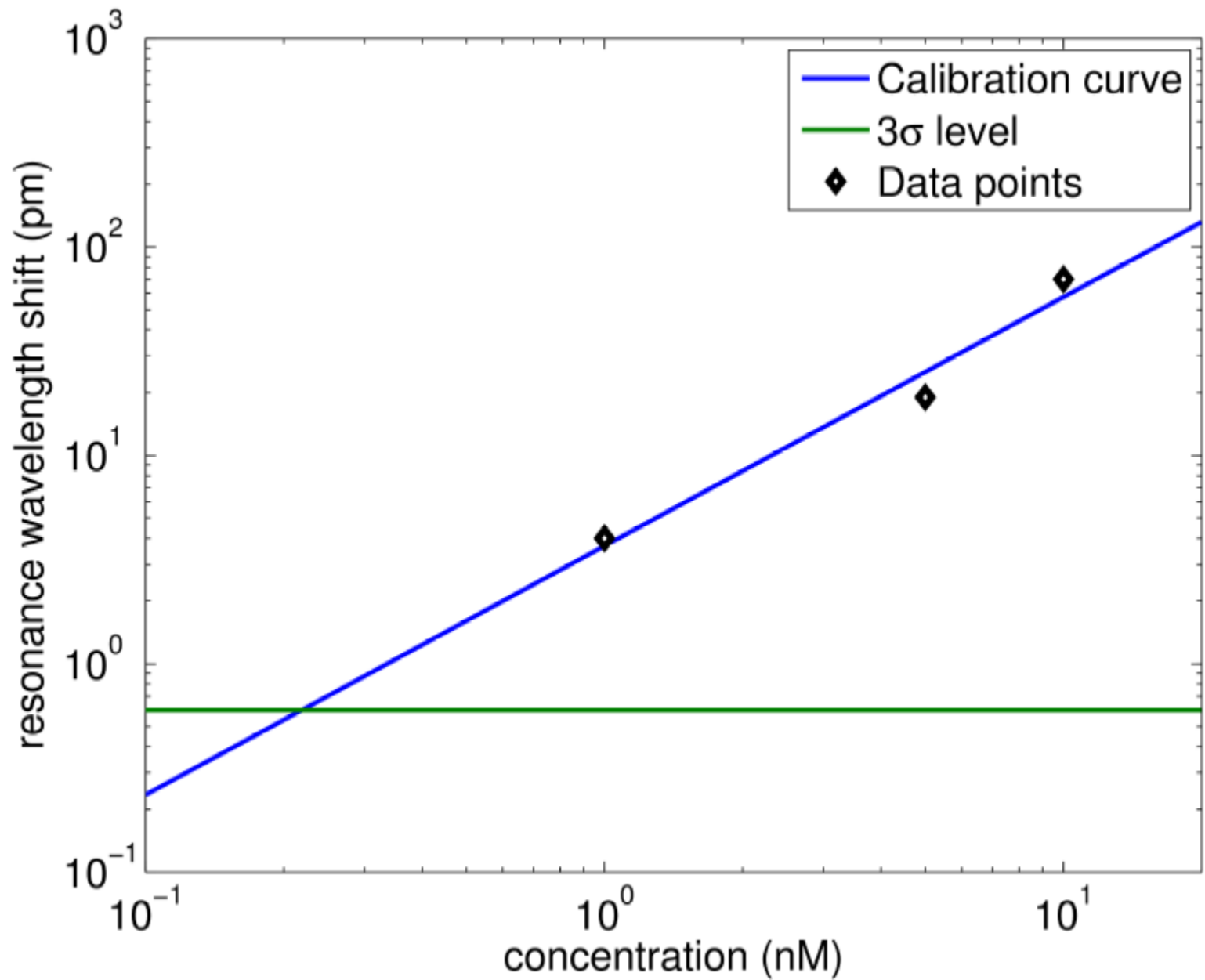
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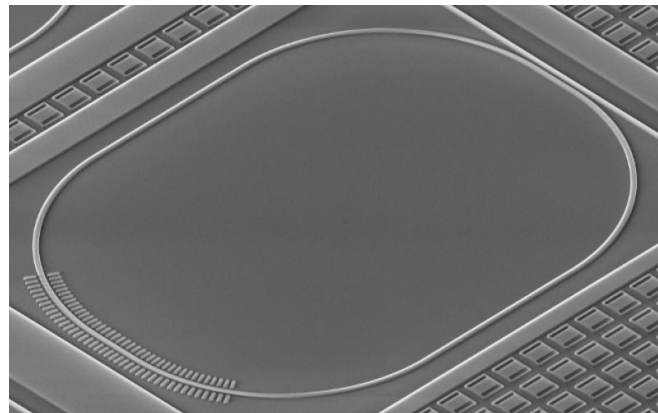
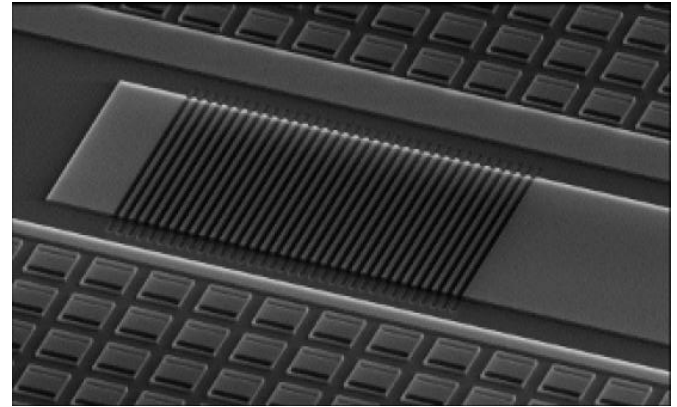
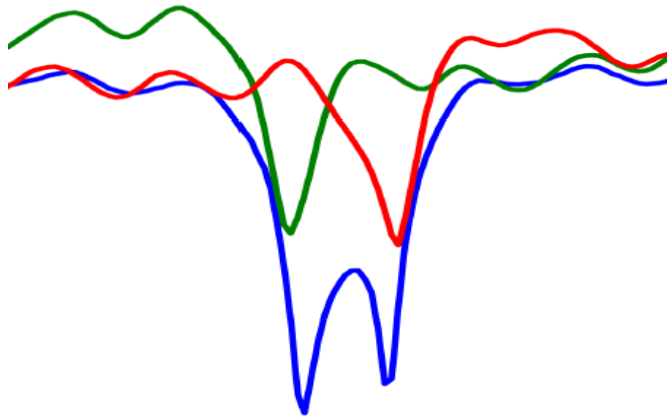
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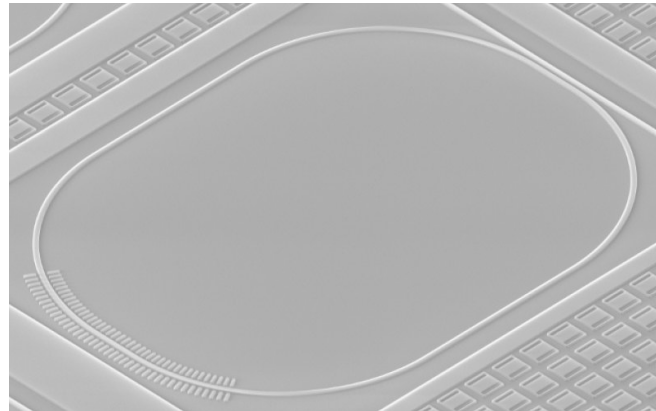
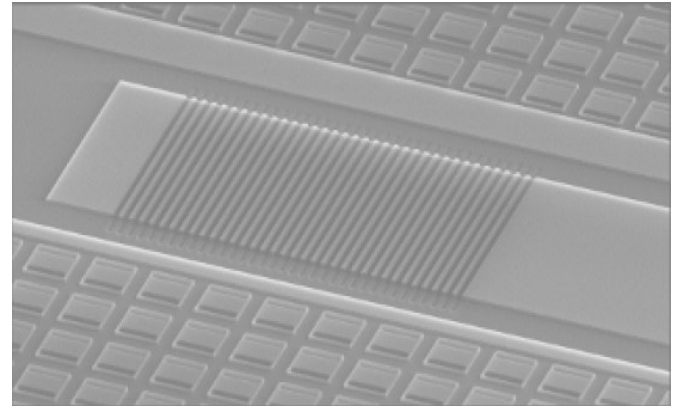


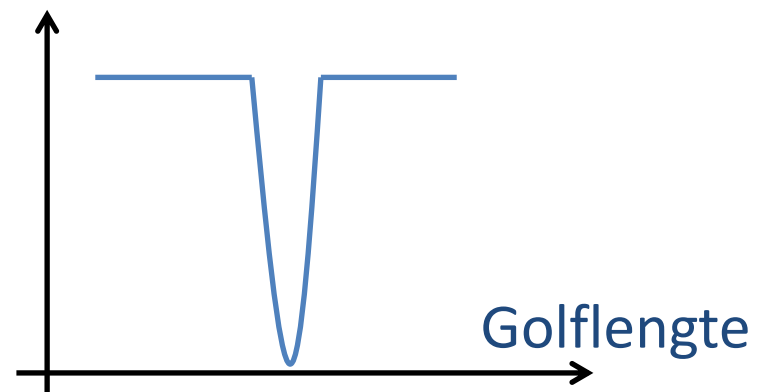


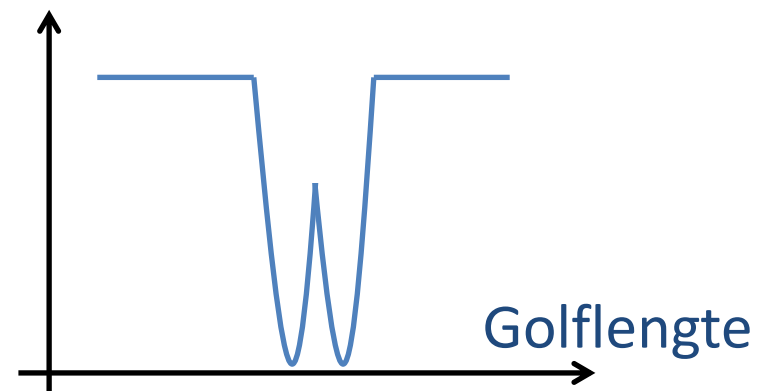
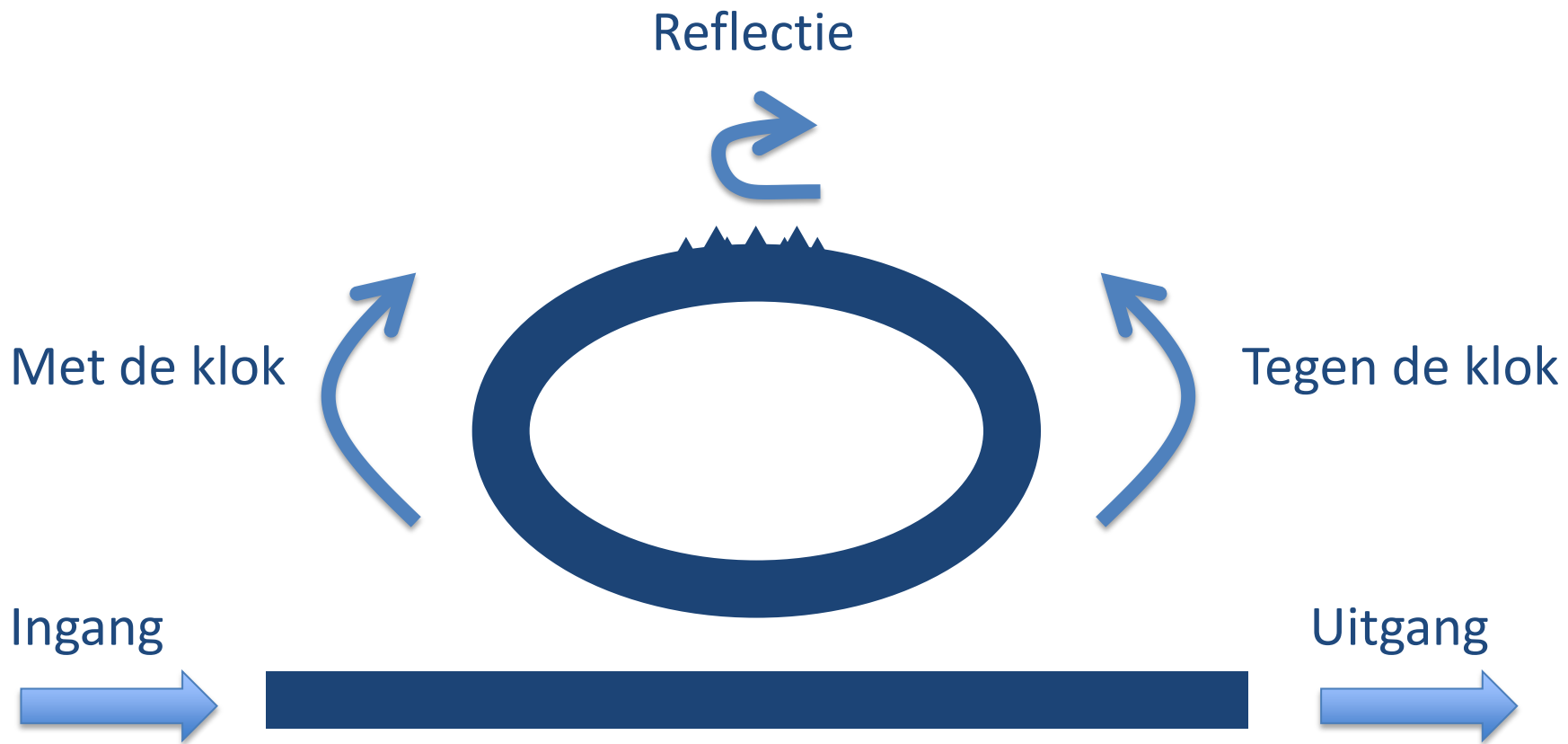


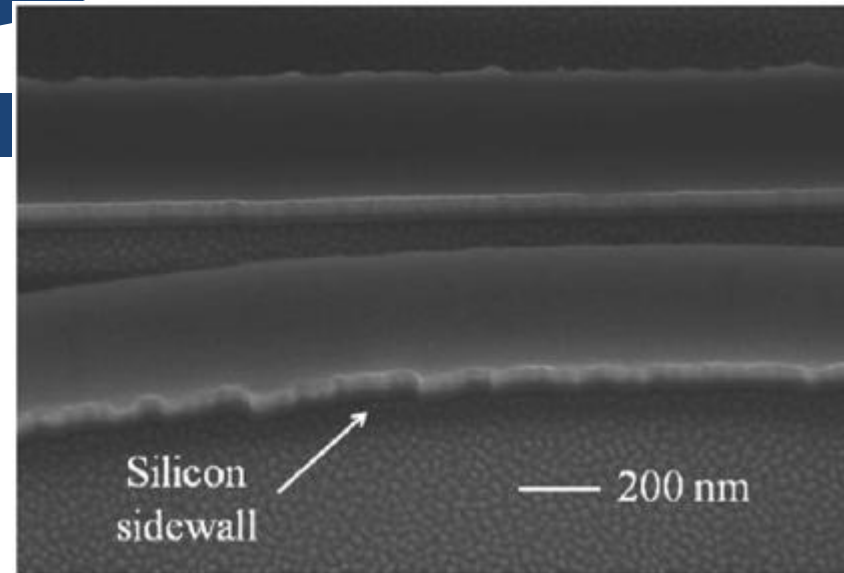
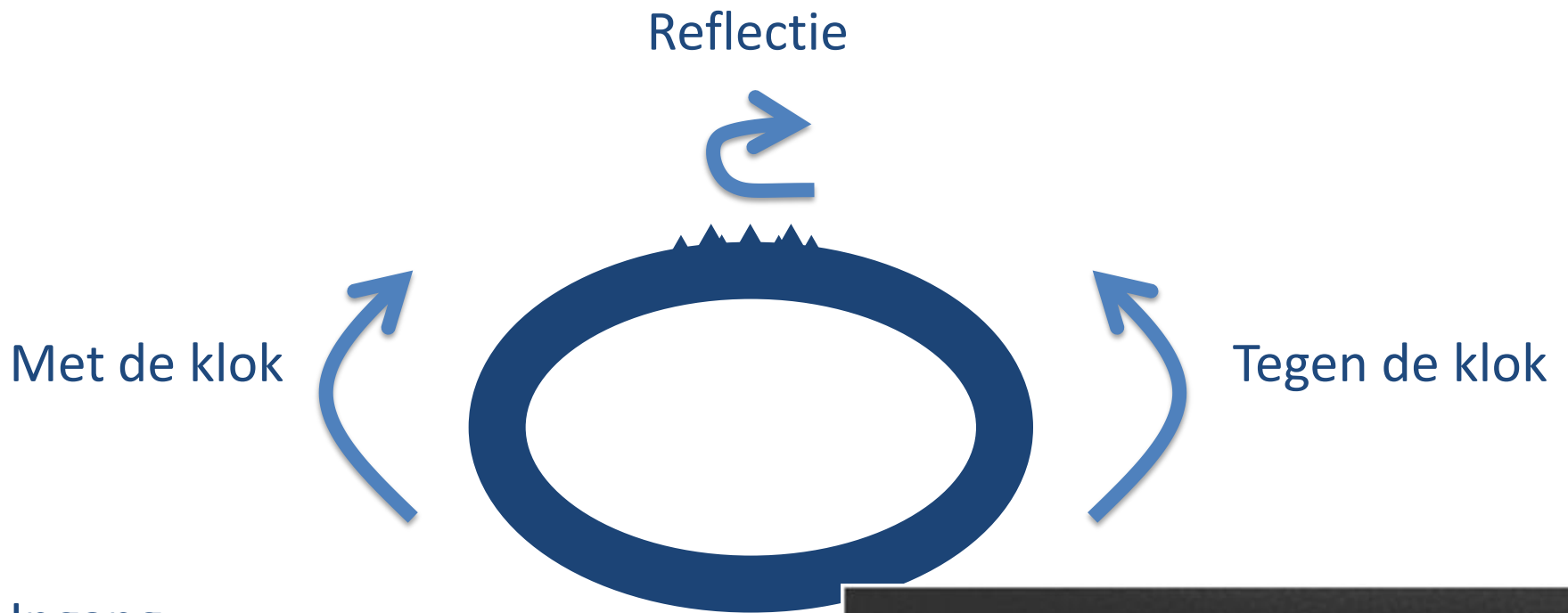
Optimalisaties van een biosensorplatform met ringresonatoren voor toepassingen in DNA-detectie

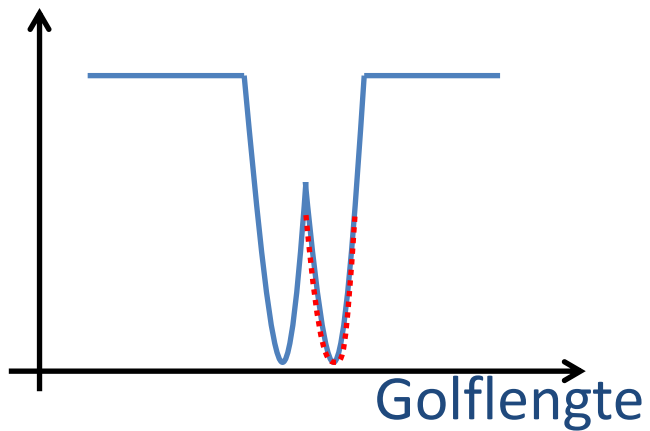
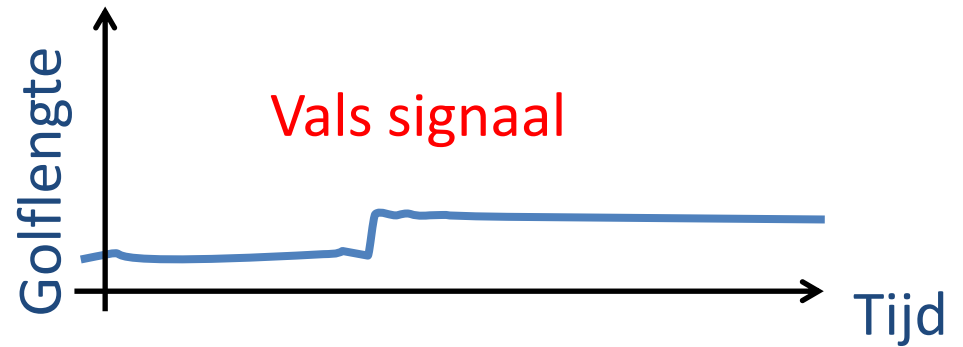
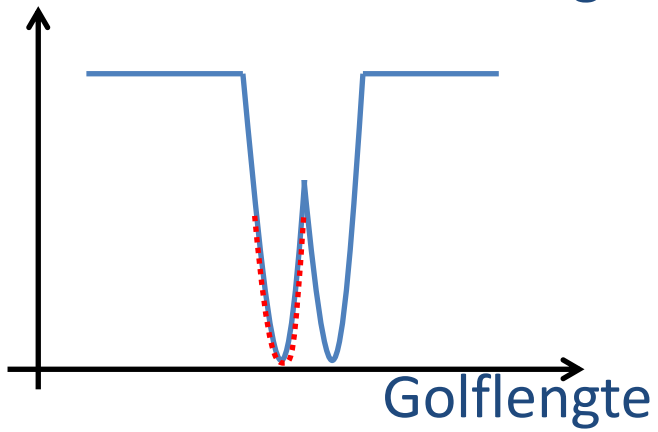
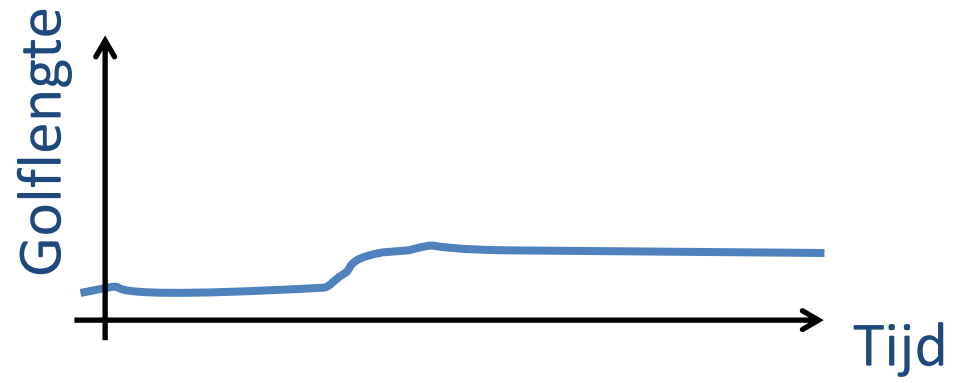
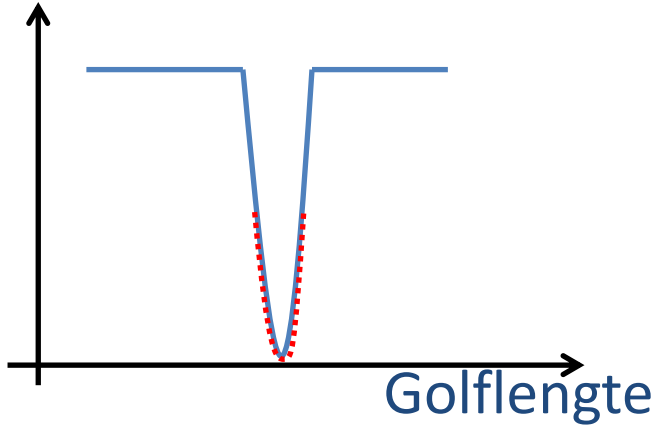




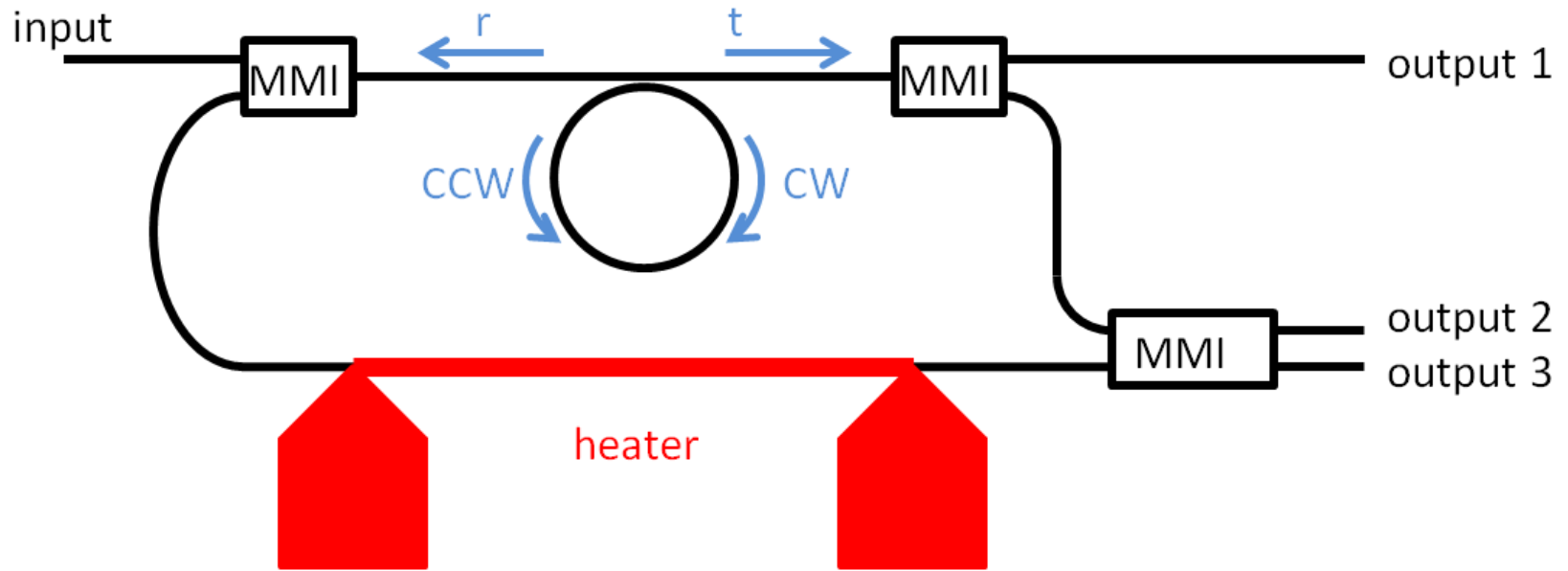


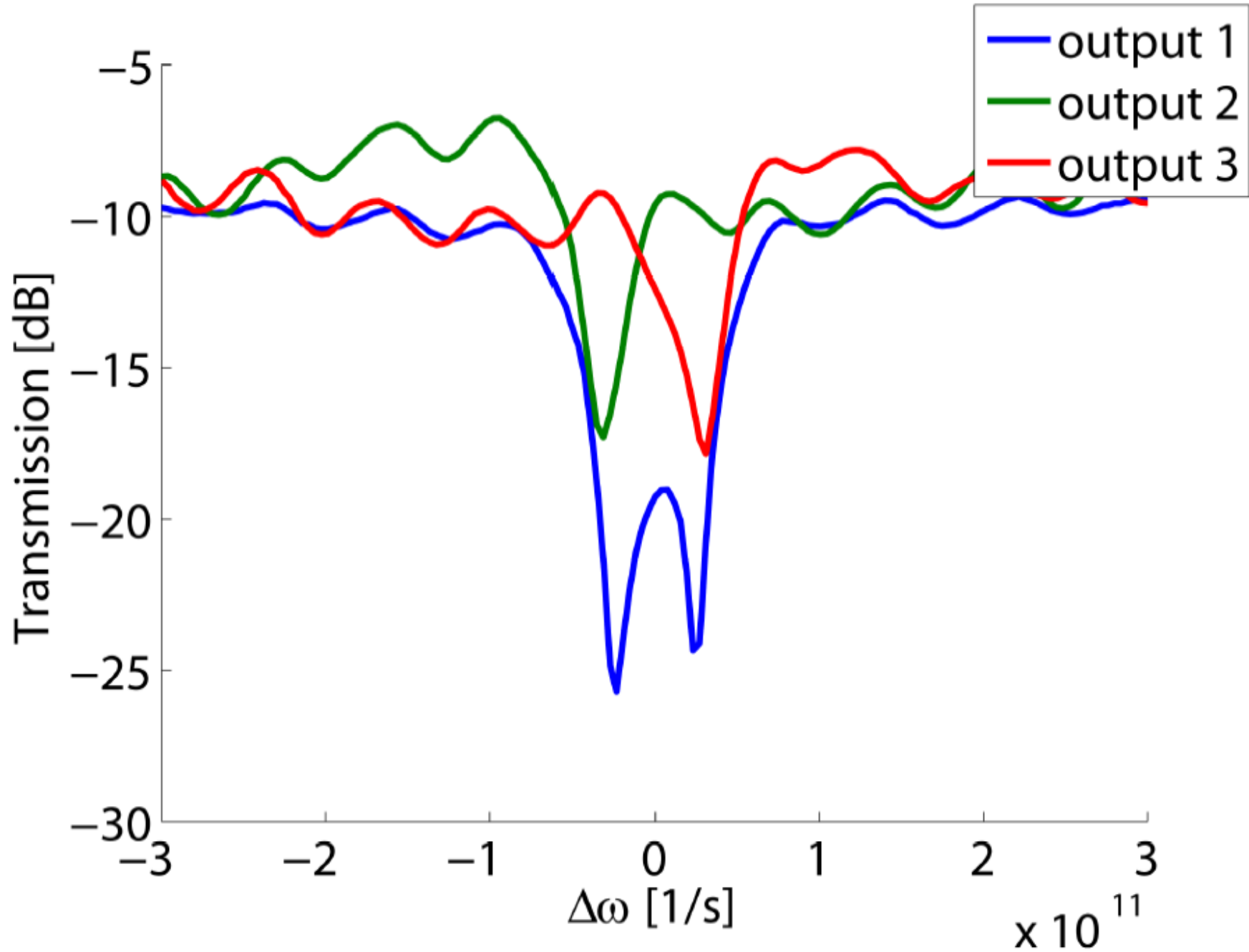


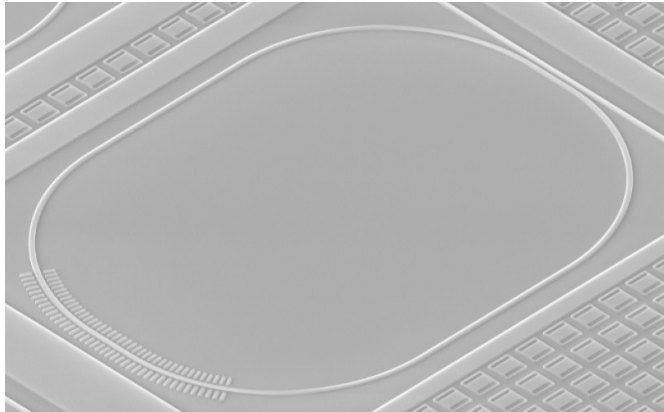
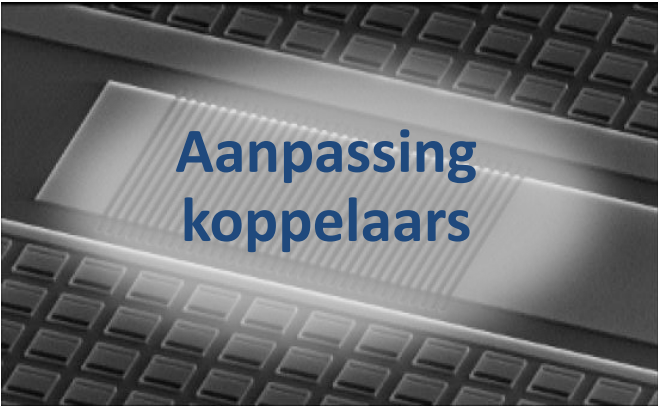
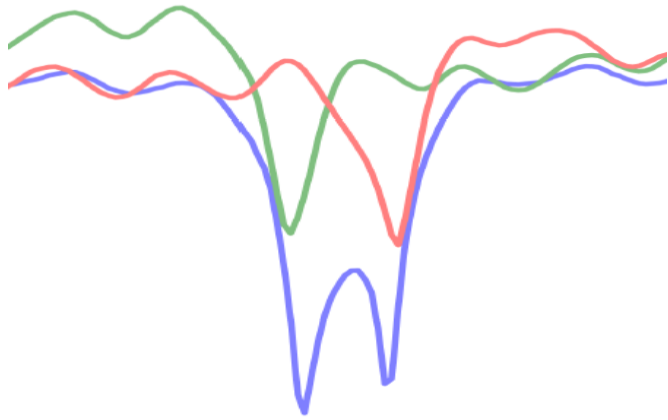


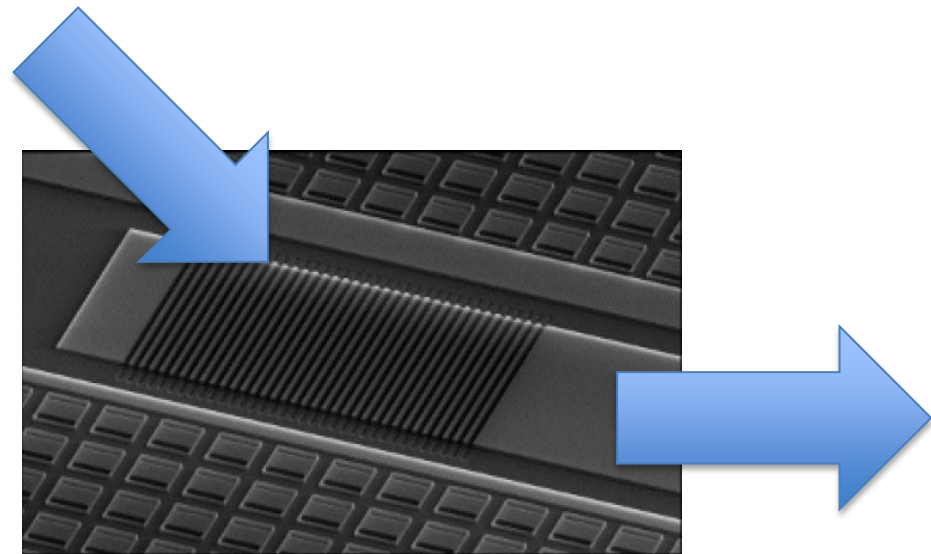


Interferometric circuit









DiffRACTIE

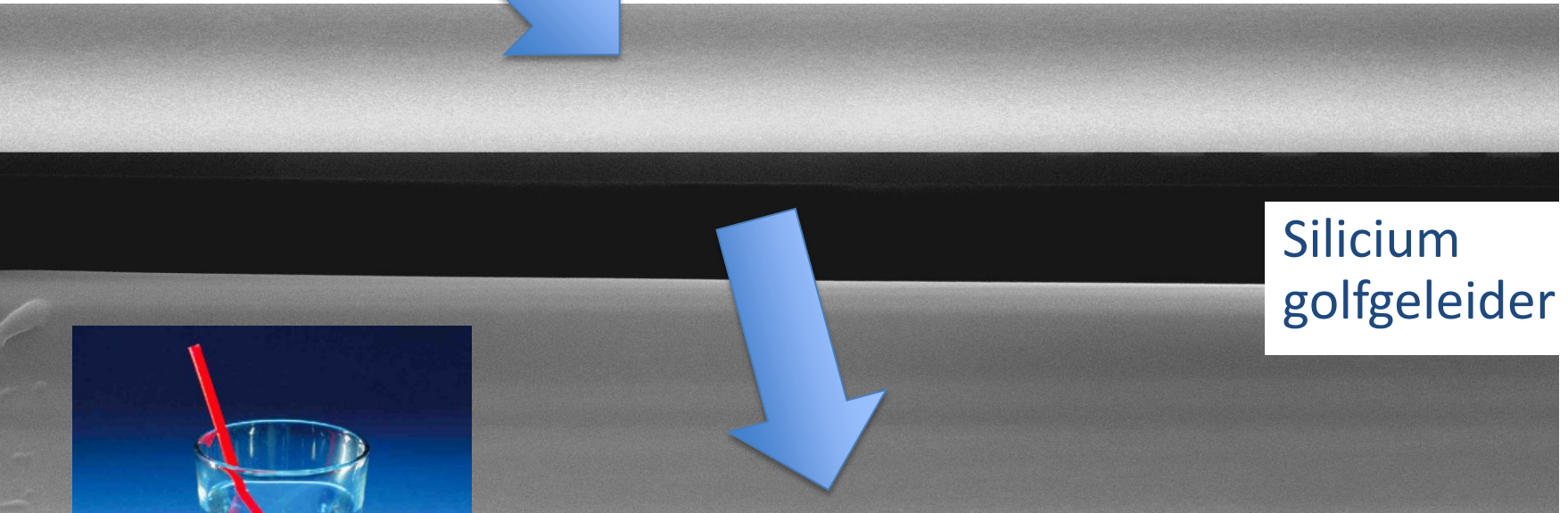
Lucht



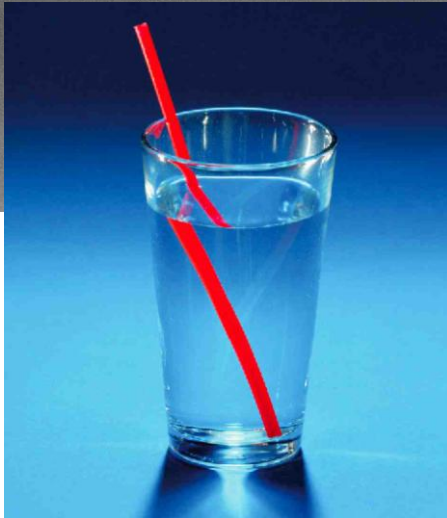
Silicium
golfsgeleider

DiffRACTie

Lucht

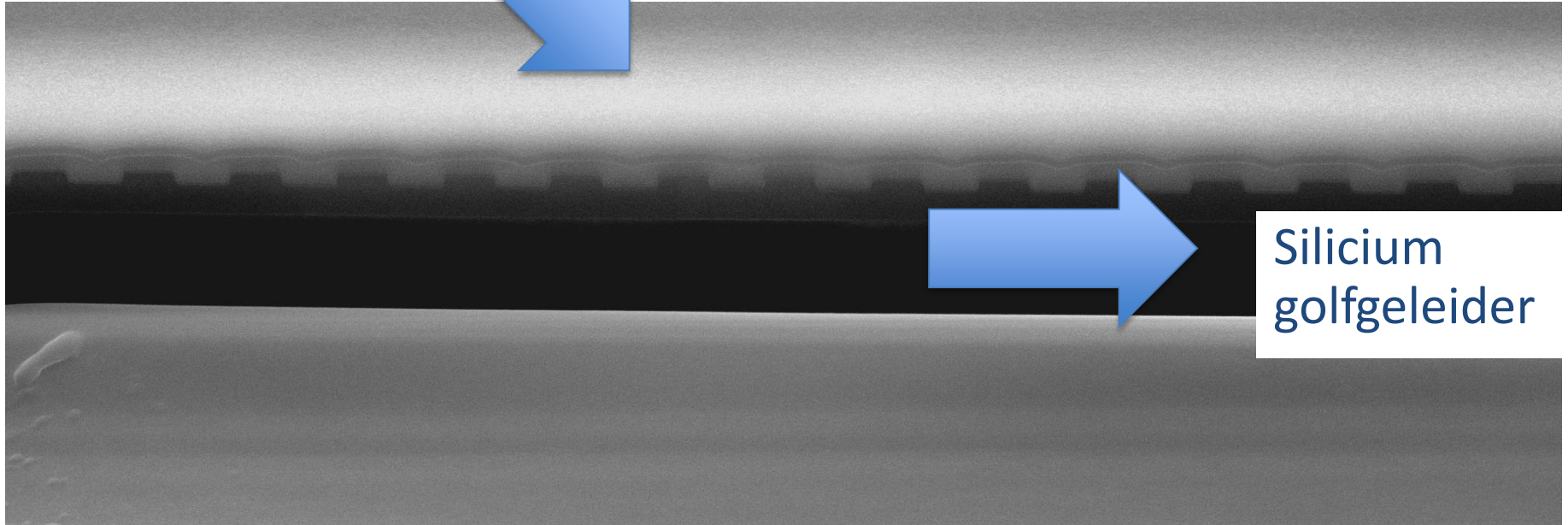


Silicium
golfgeleider



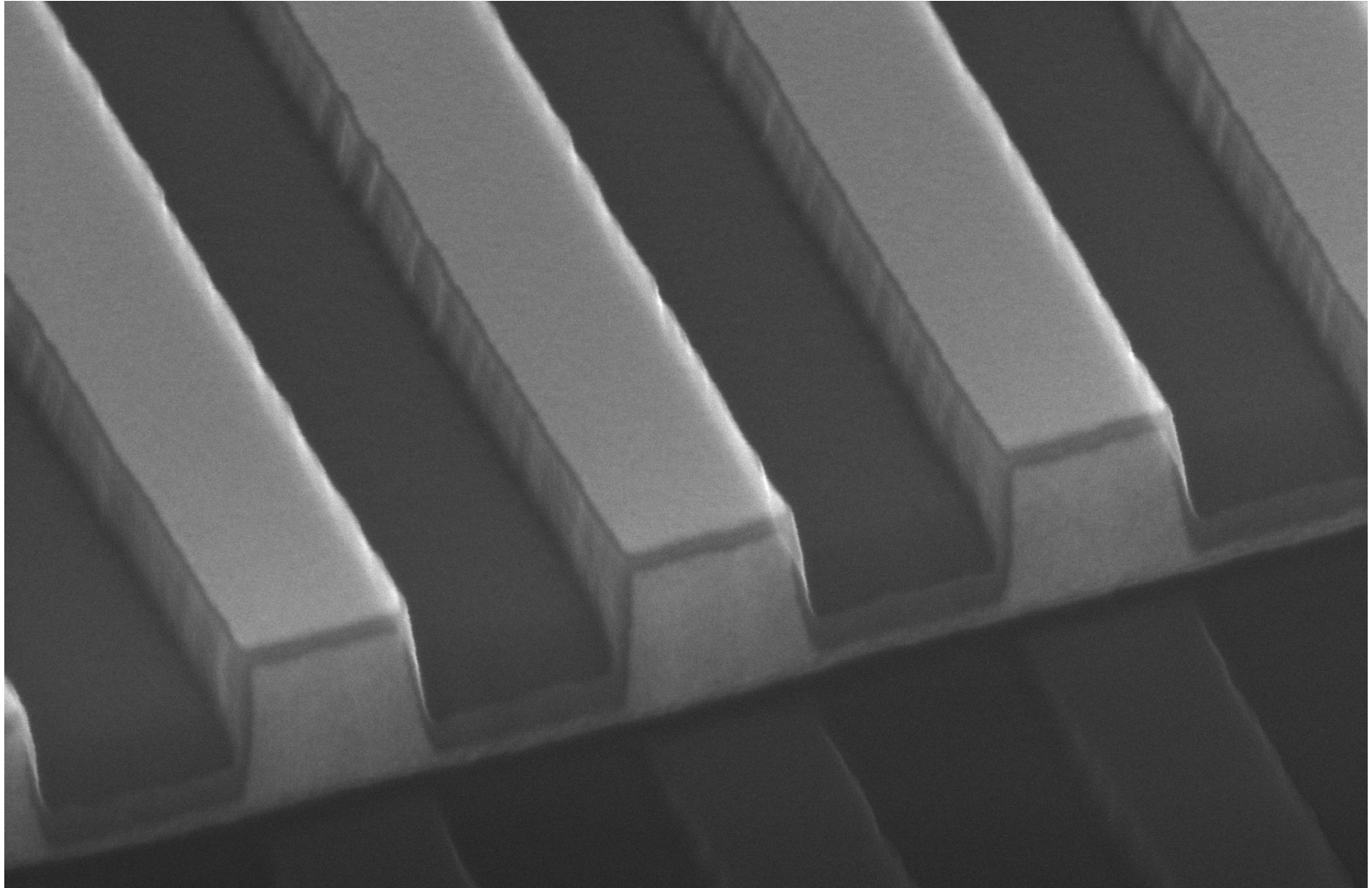
Diffractierooster

Lucht

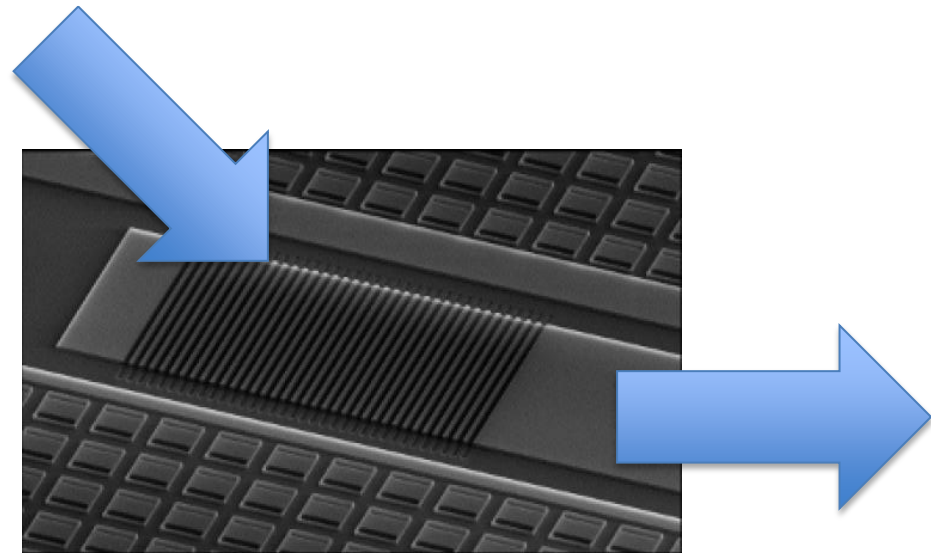
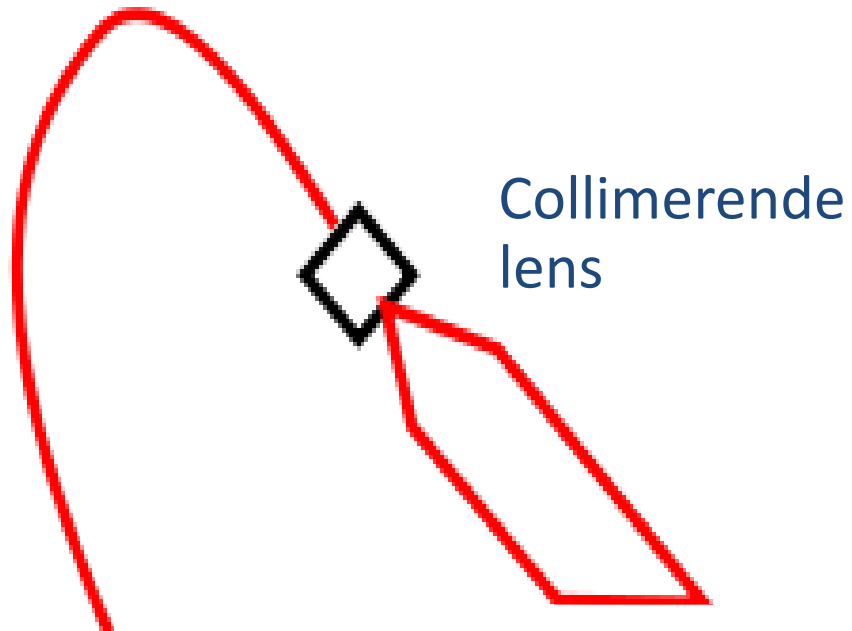


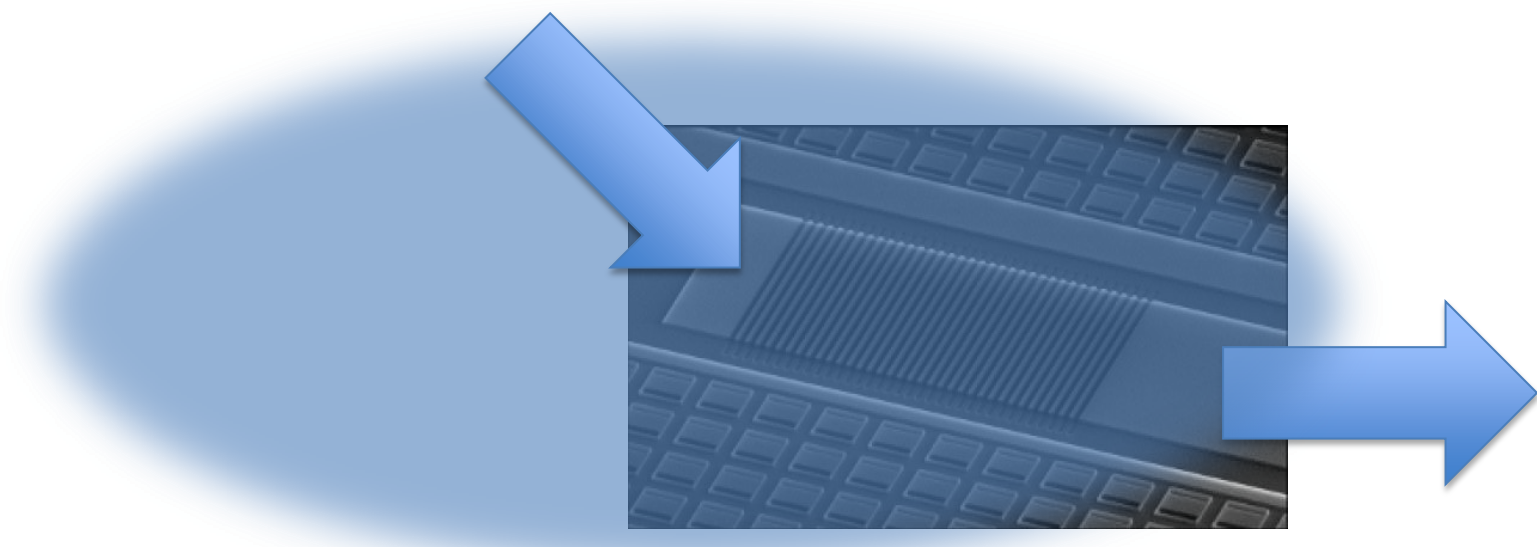
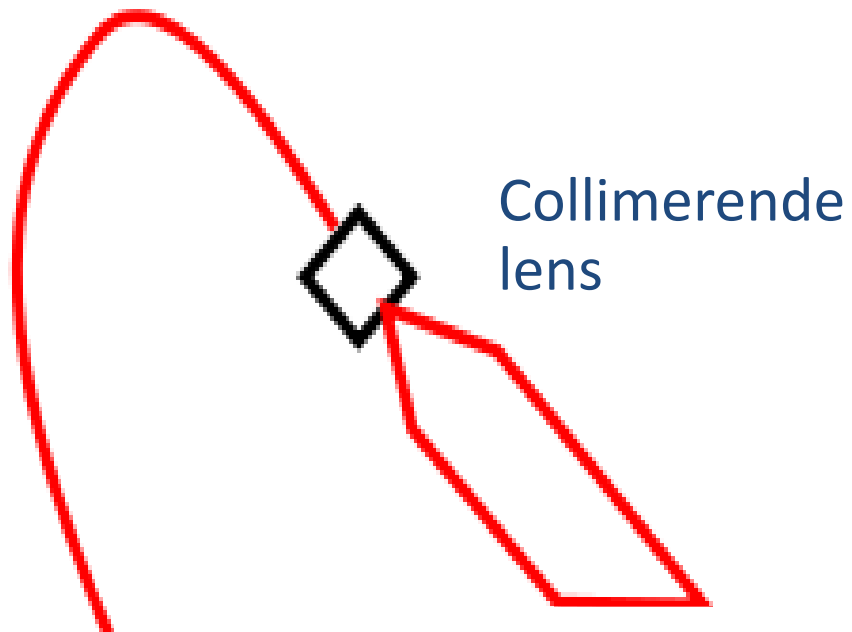
Silicium
golfgeleider

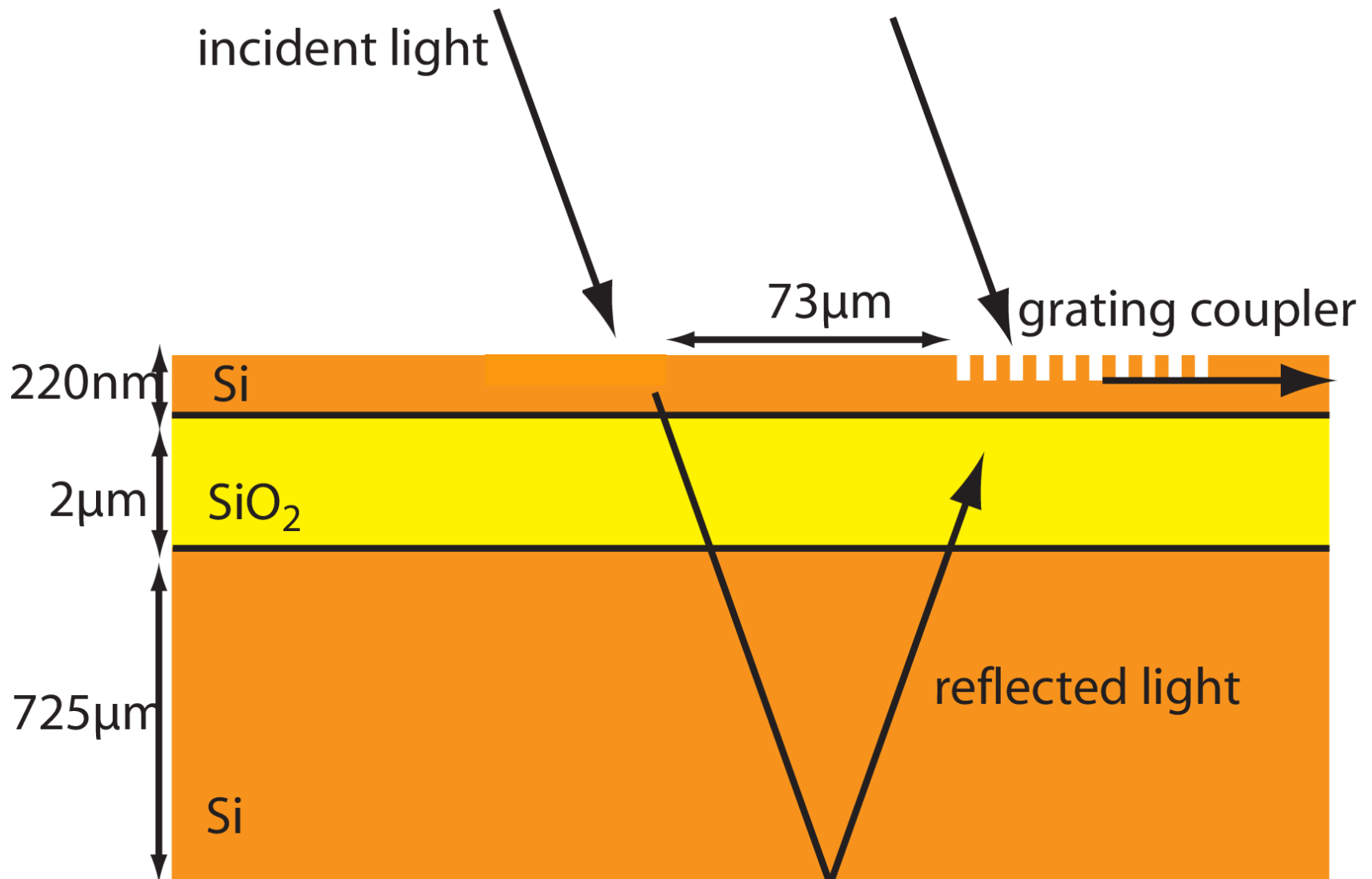
Roosterkoppelaar



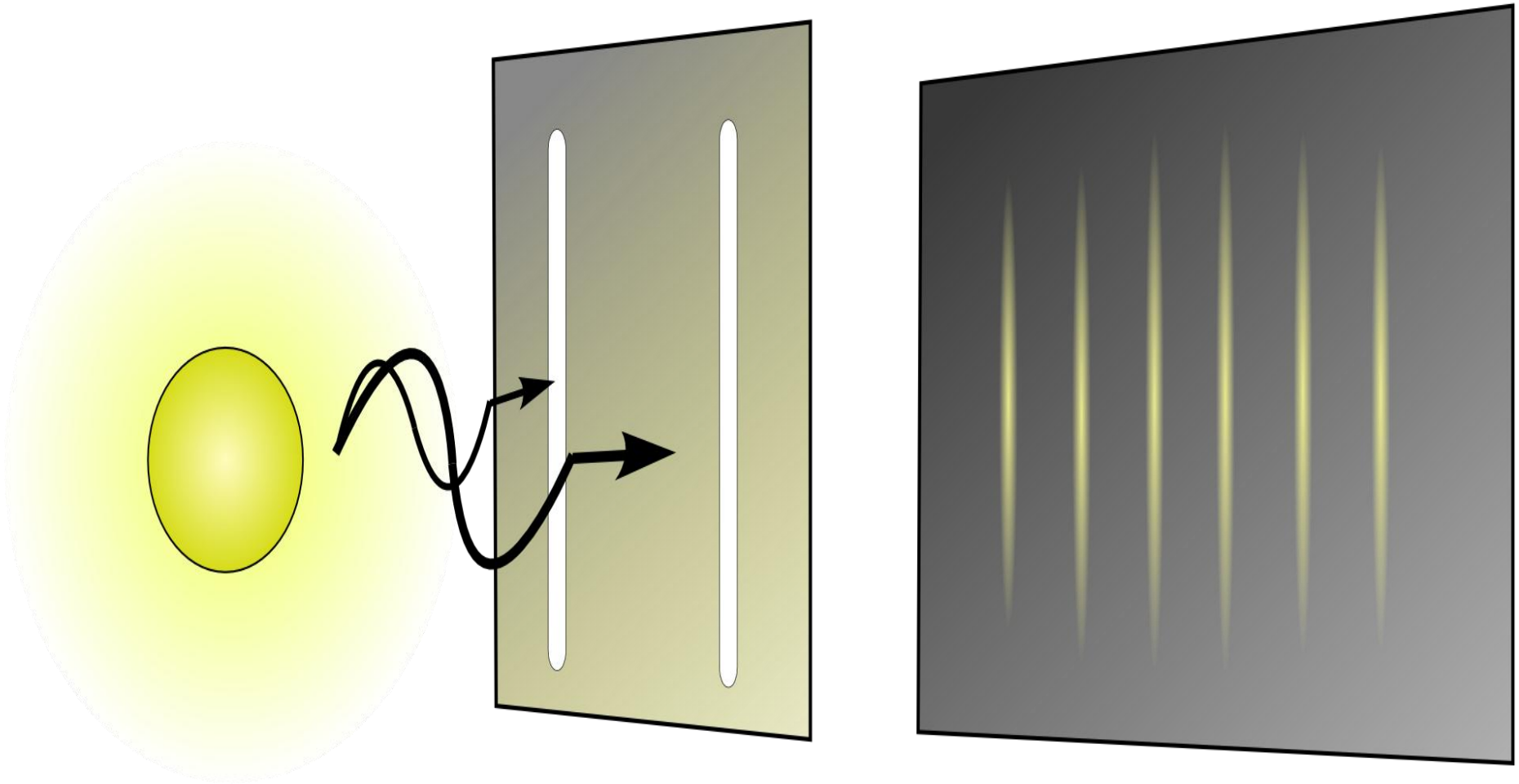
mag	WD	tilt	HV	9/1/2014	HFW	500 nm
75 000 x	5.1 mm	52 °	18.00 kV	11:41:56 AM	1.71 μm	Ugent

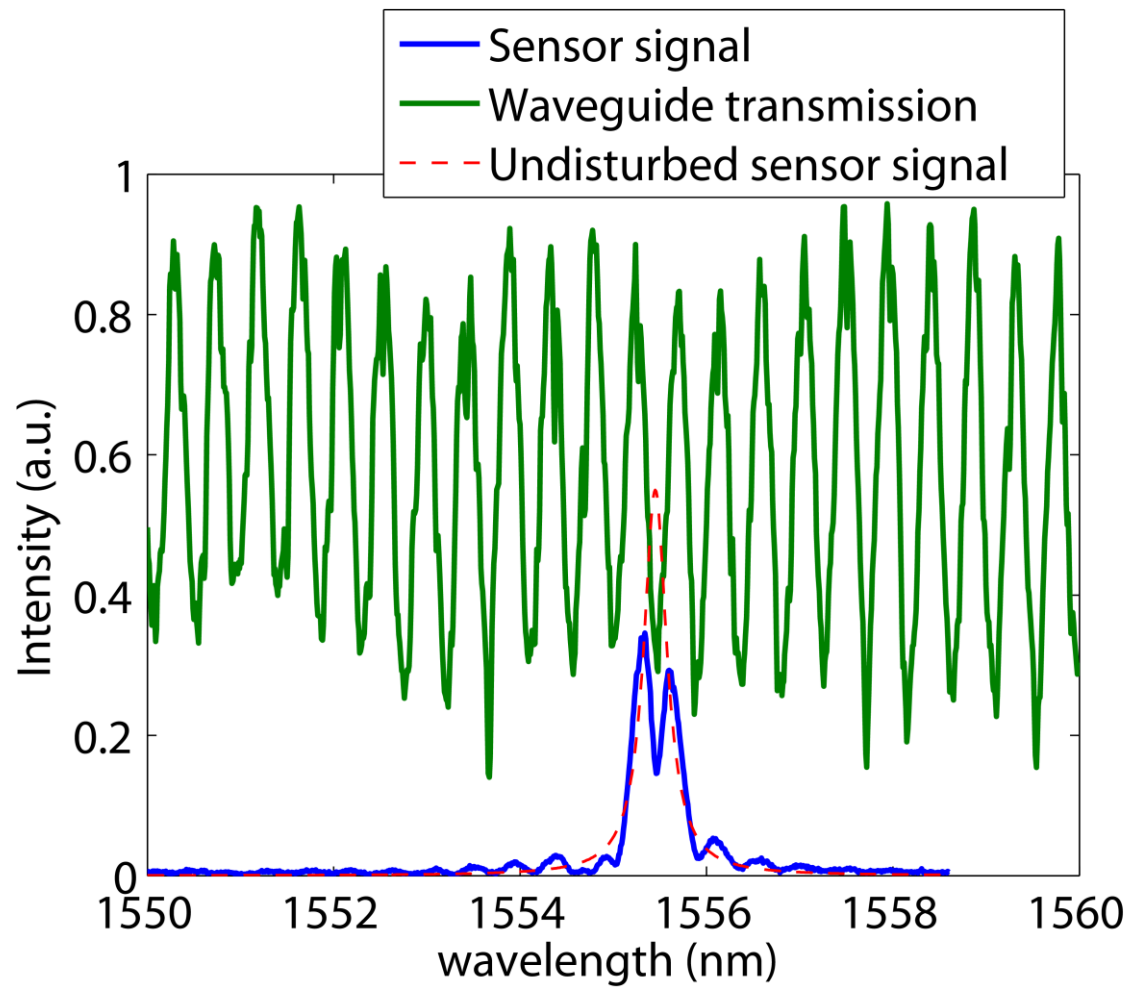


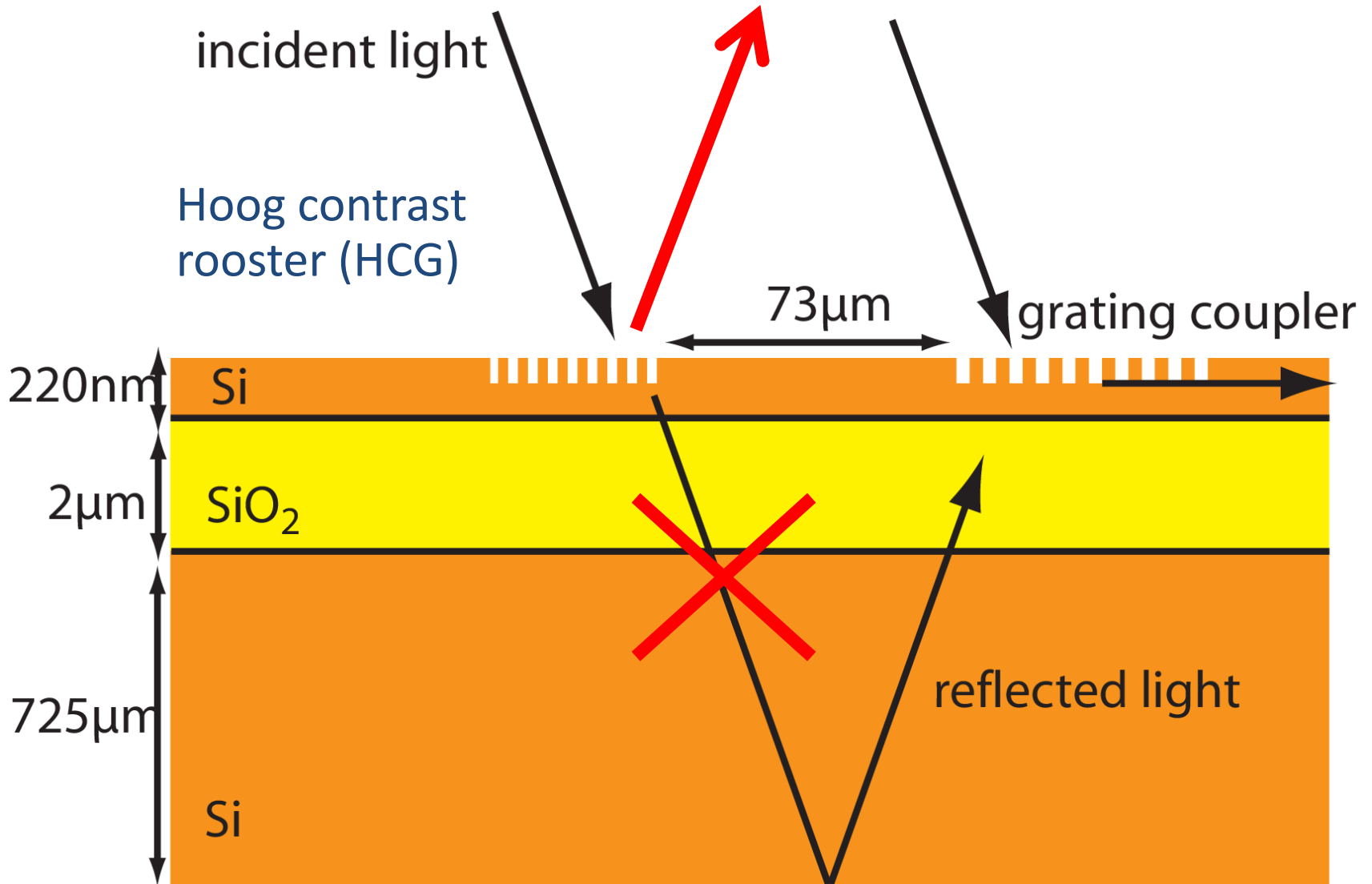


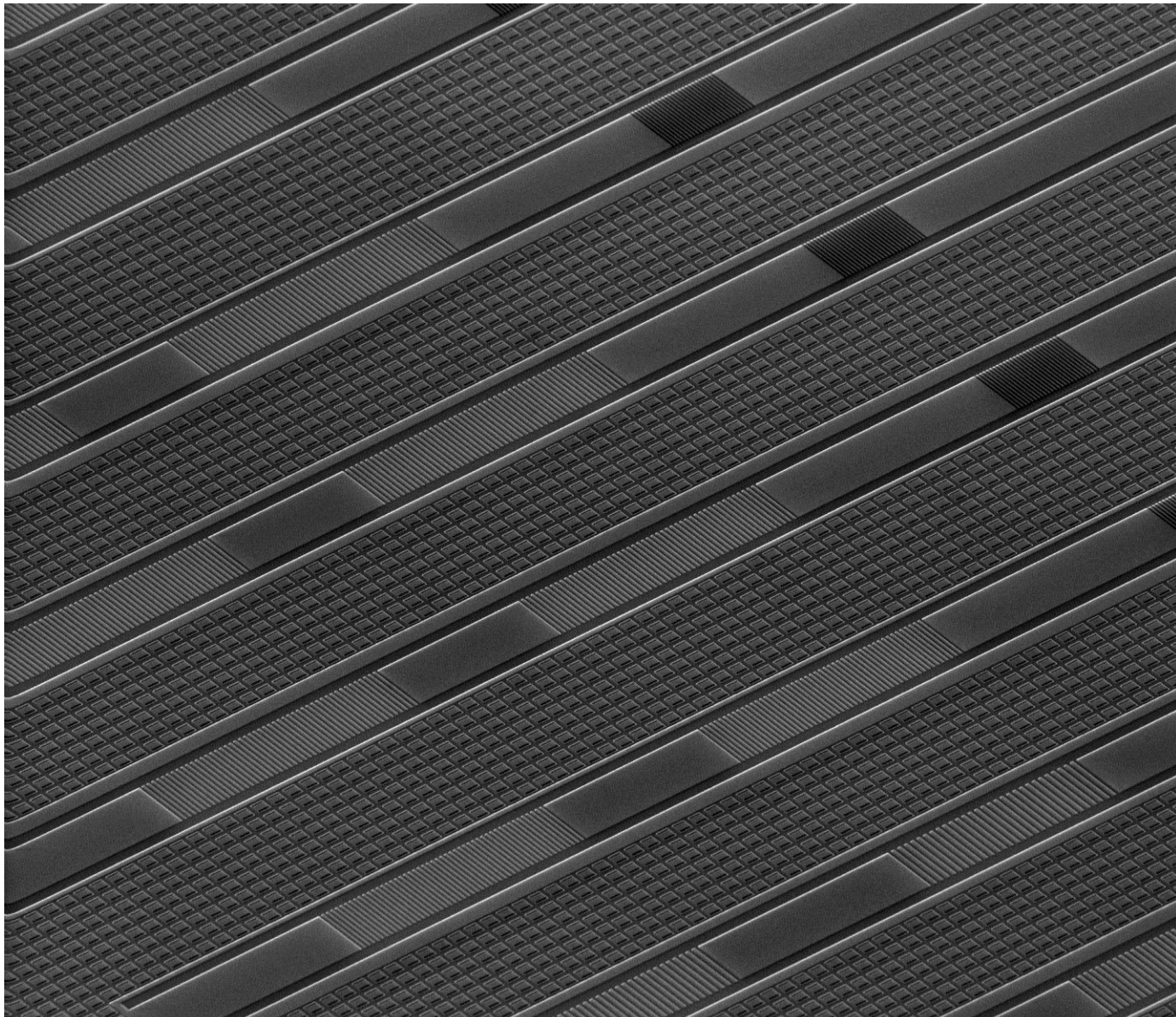


Interferentie

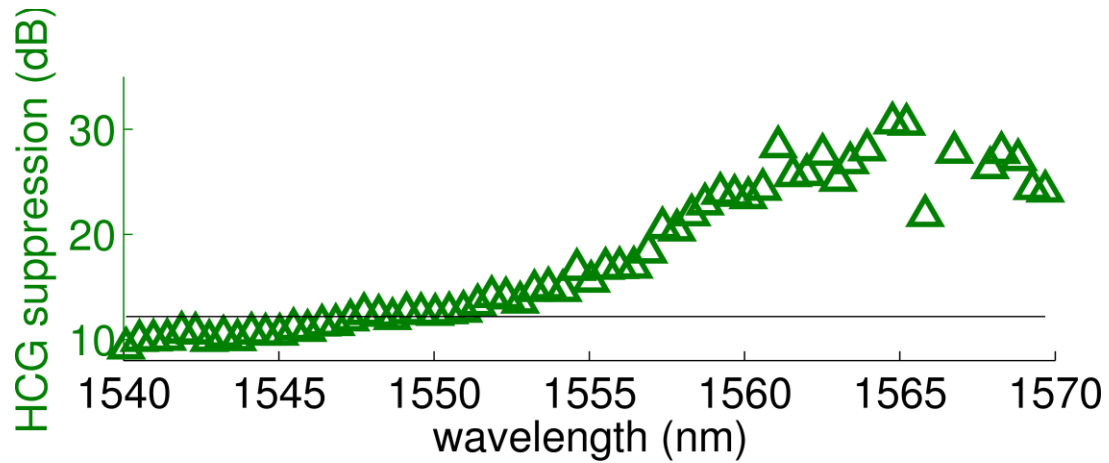
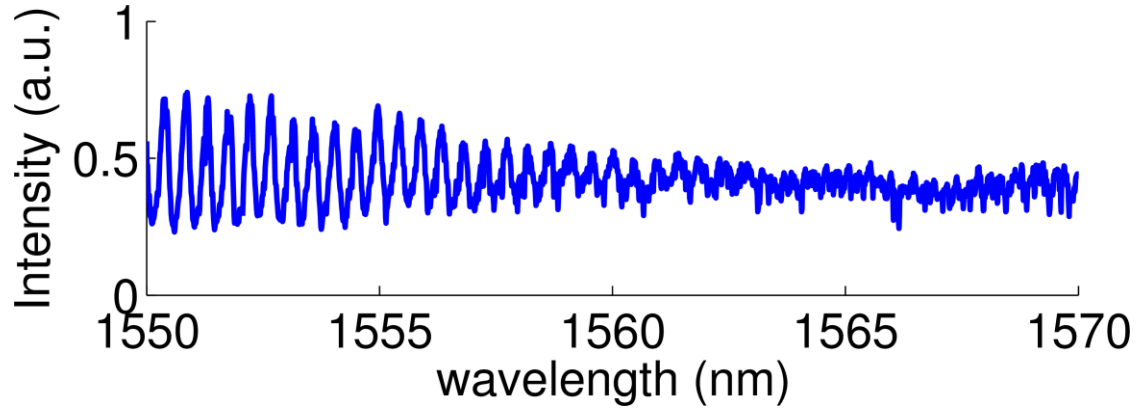


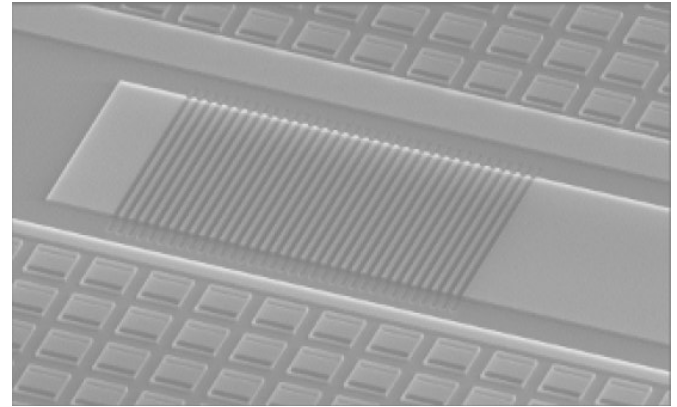
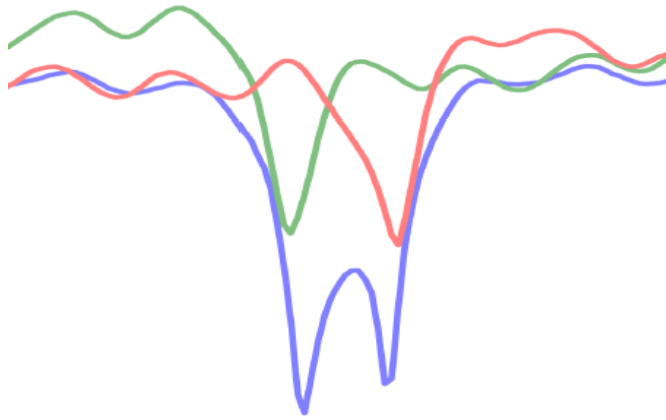


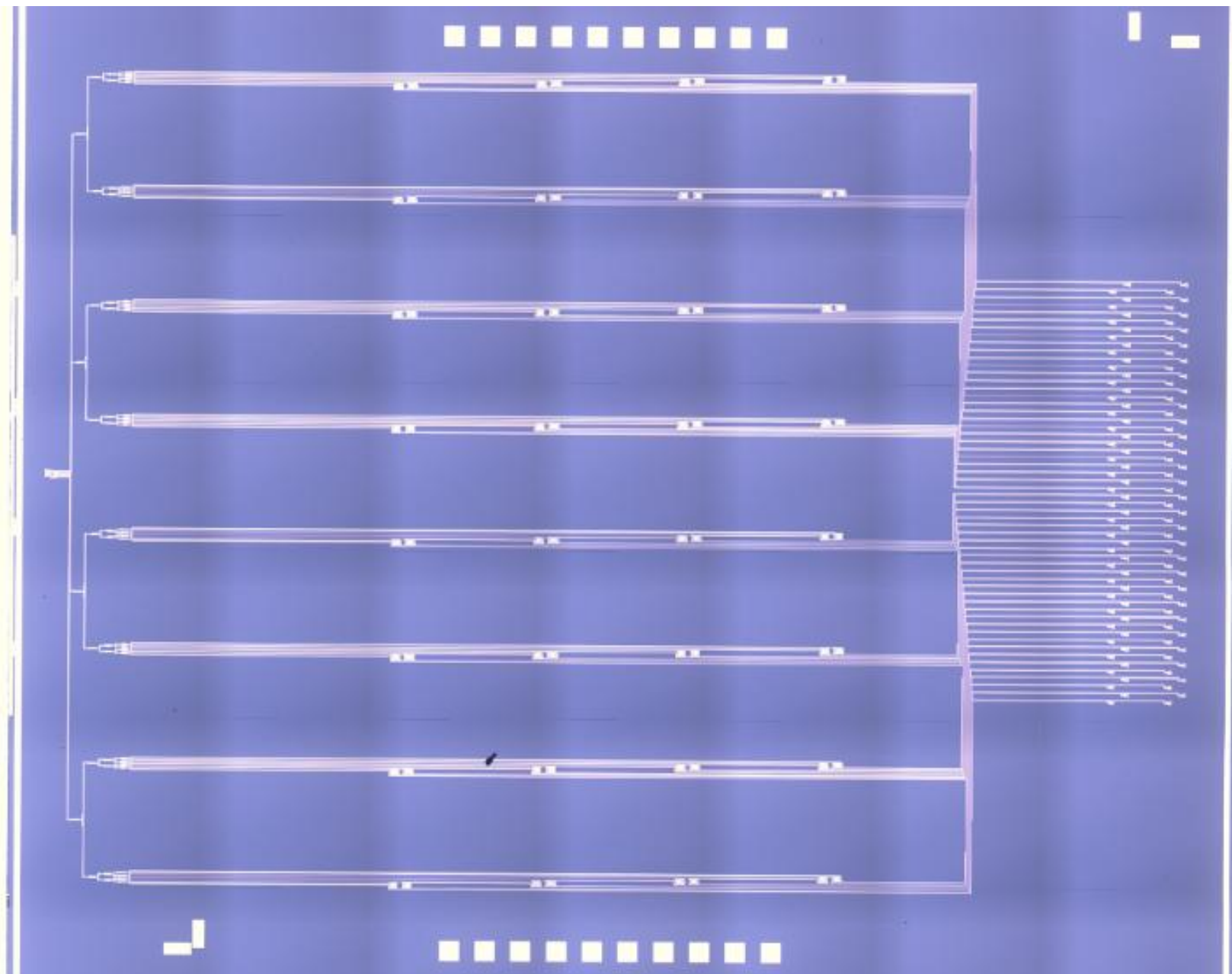


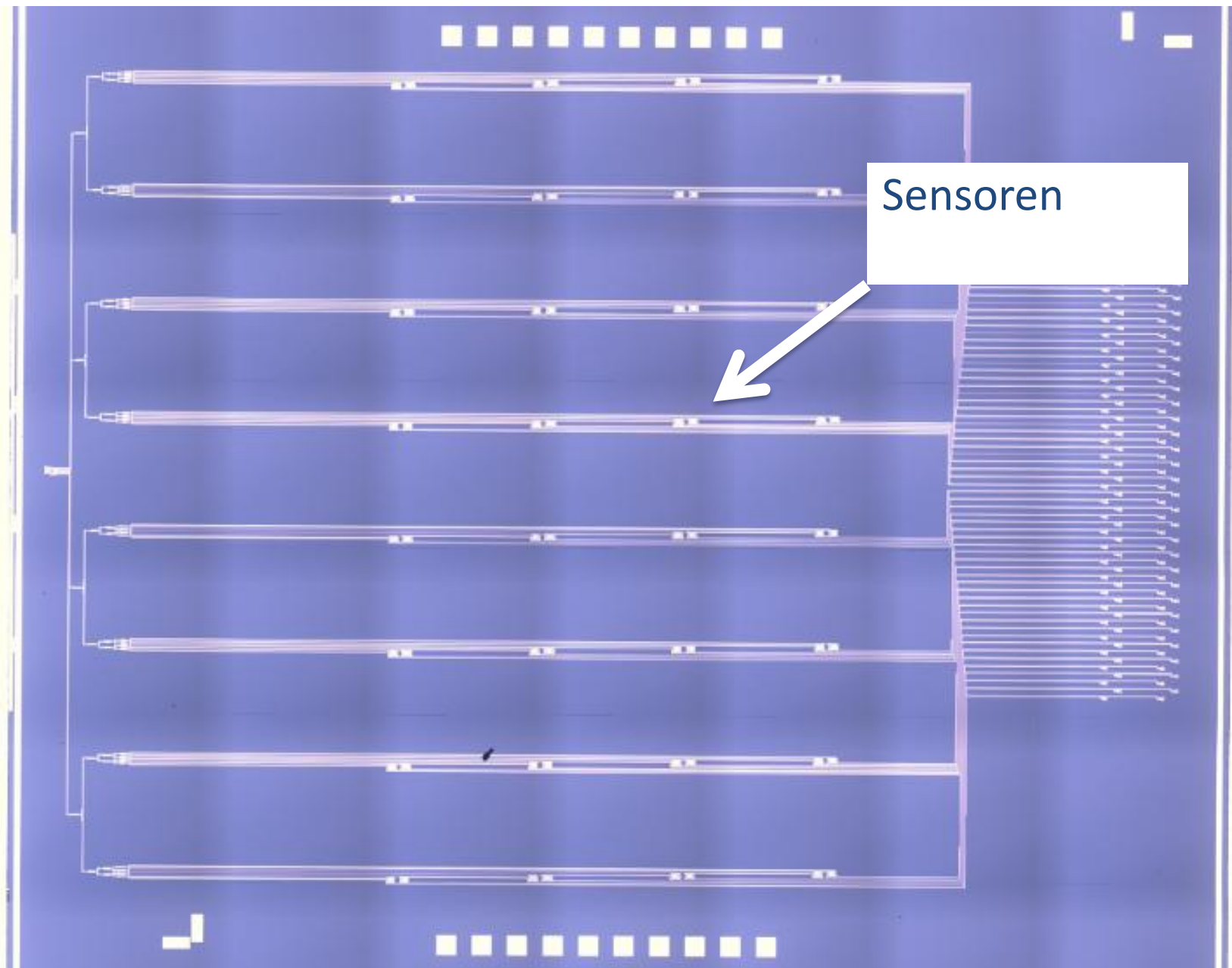


mag	WD	tilt	HV	9/1/2014	HFW	50 μ m
750 x	5.1 mm	52 °	30.00 kV	11:48:57 AM	171 μ m	Ugent









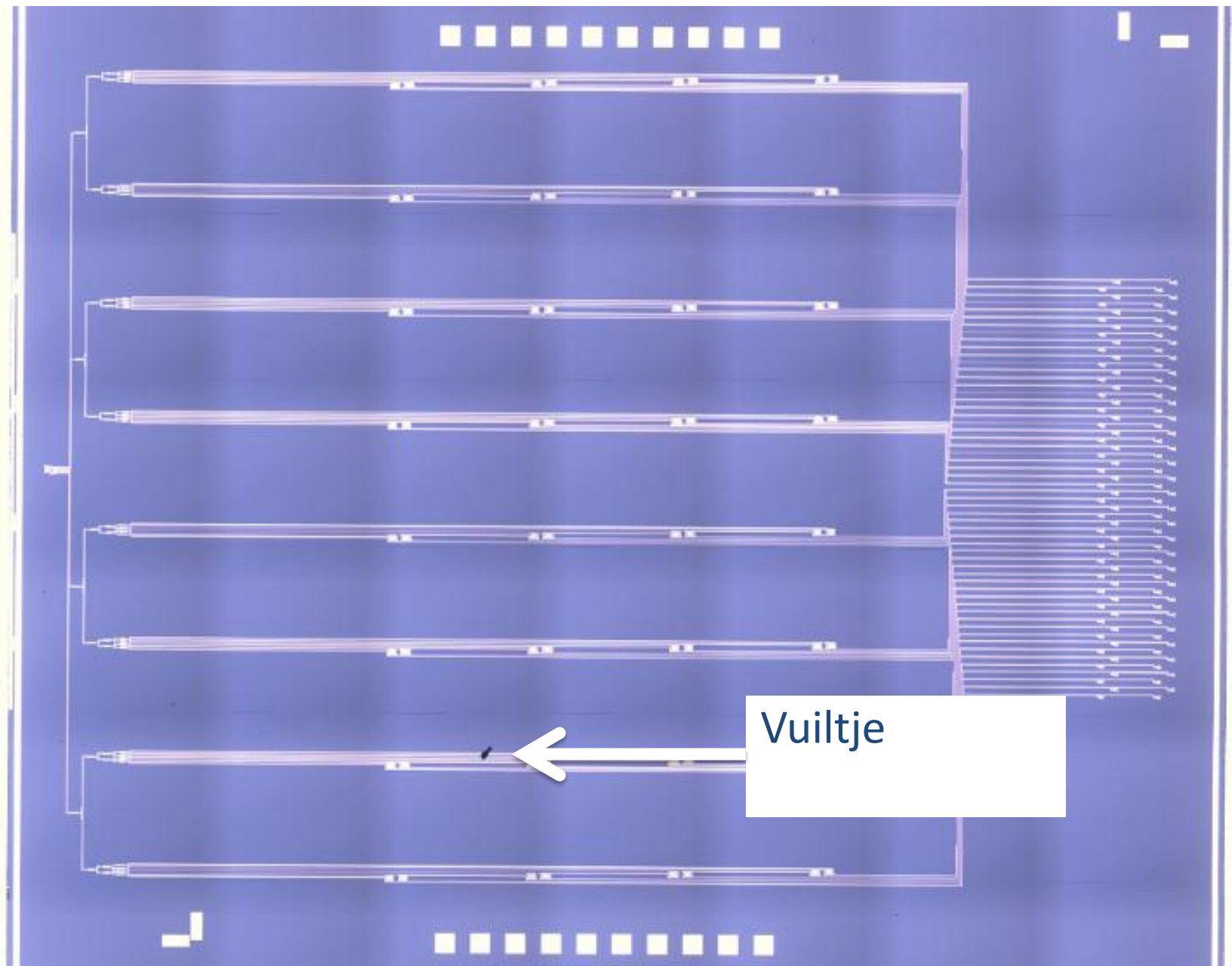
Sensoren

Ingang

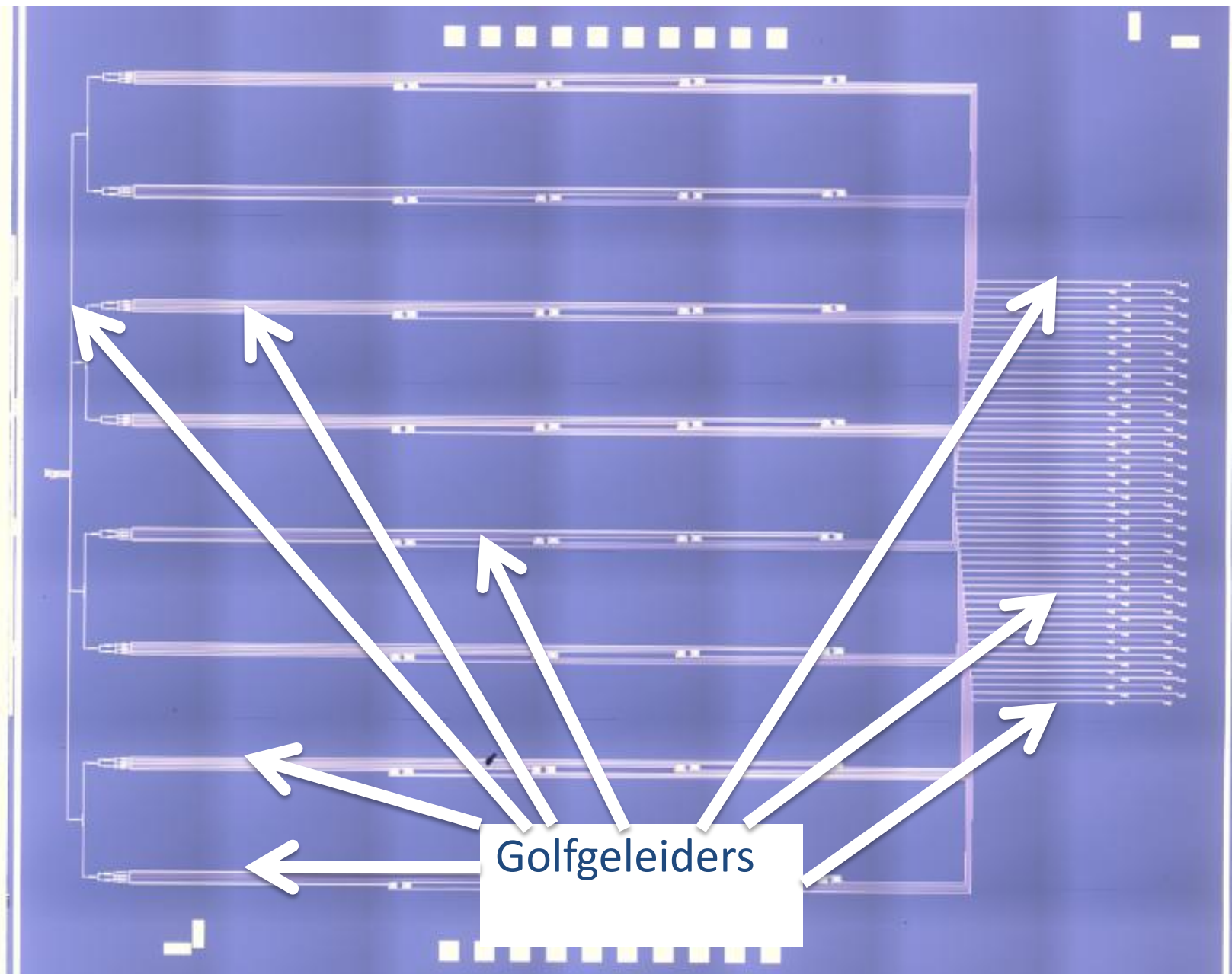


Uitgang

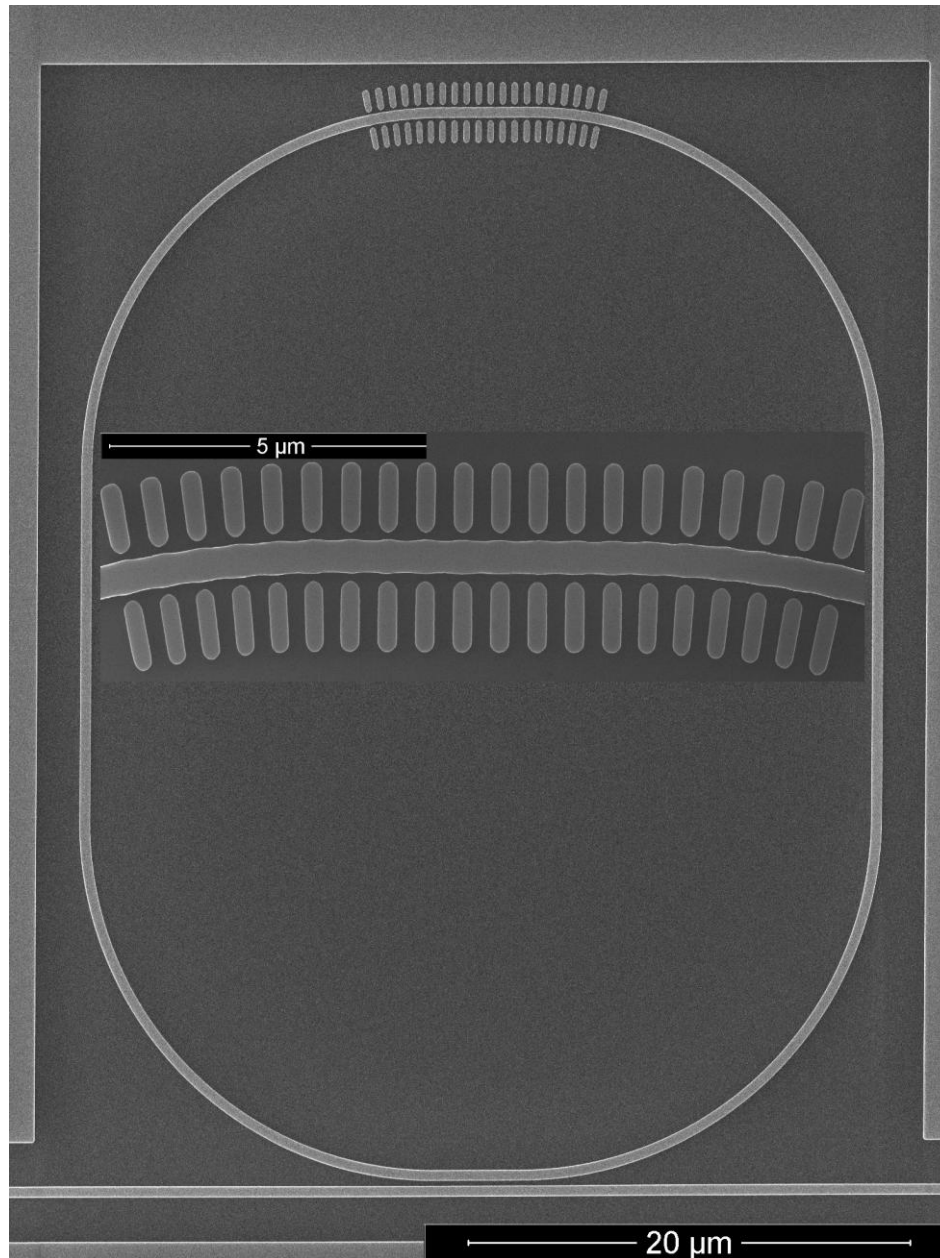


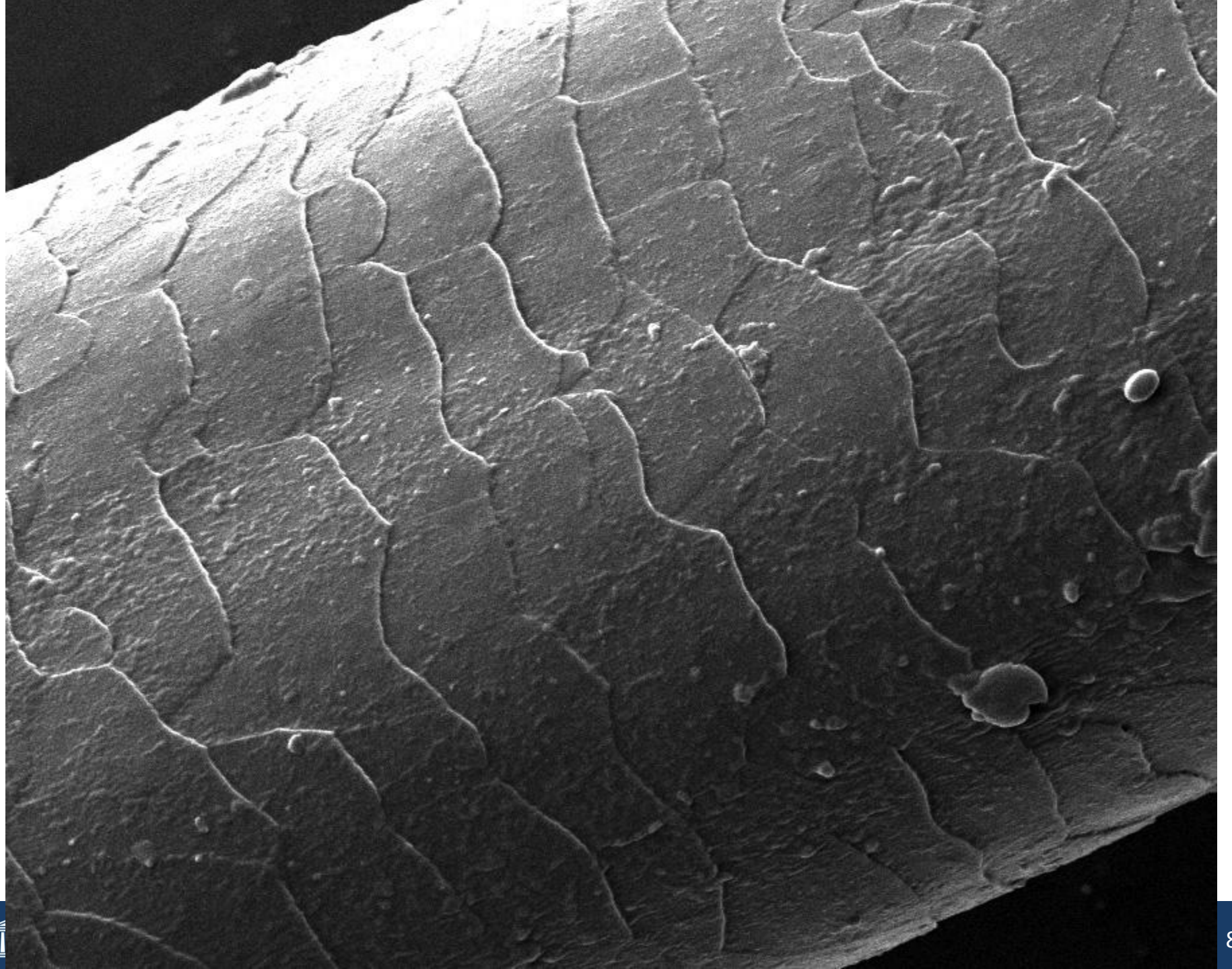


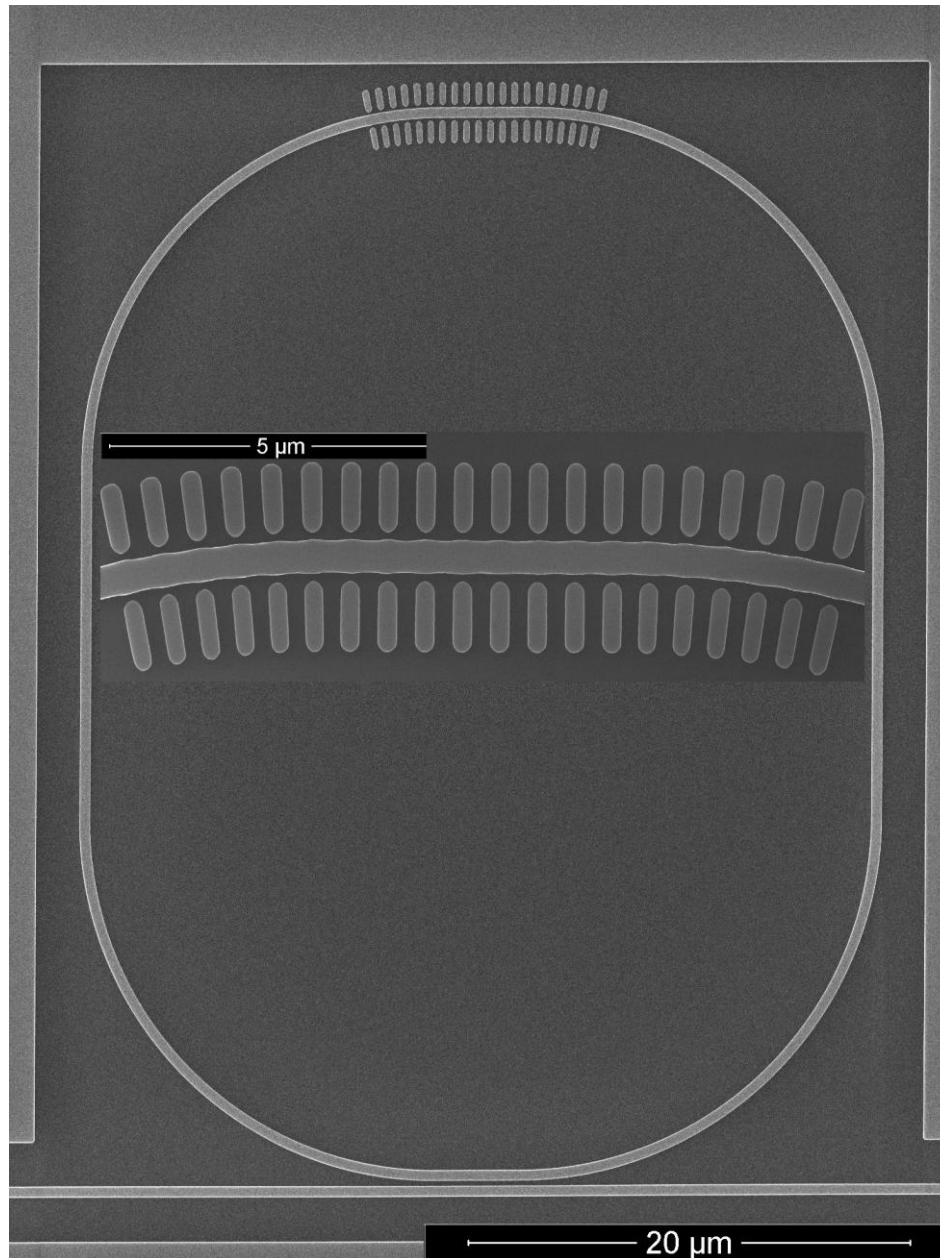
Vuiltje

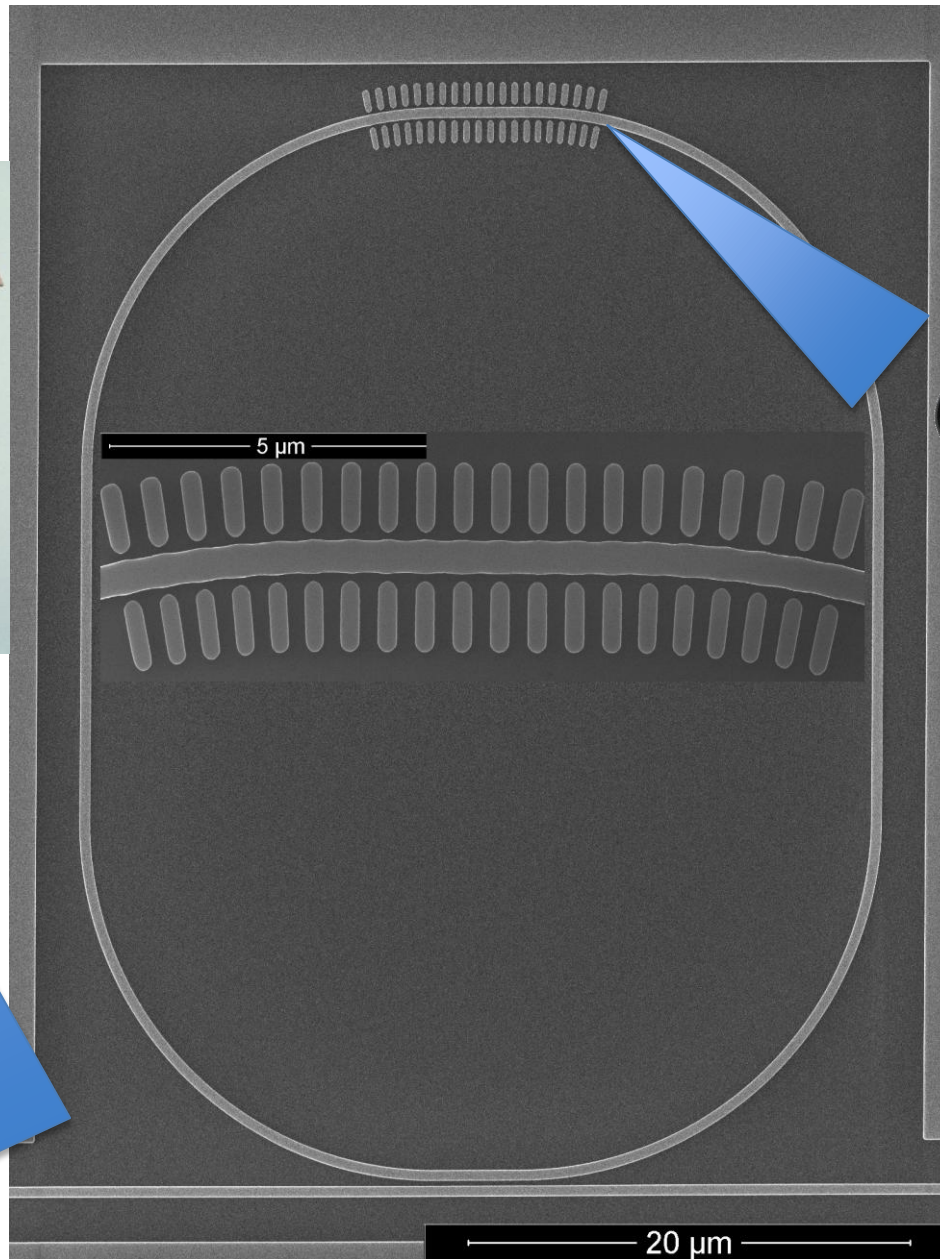


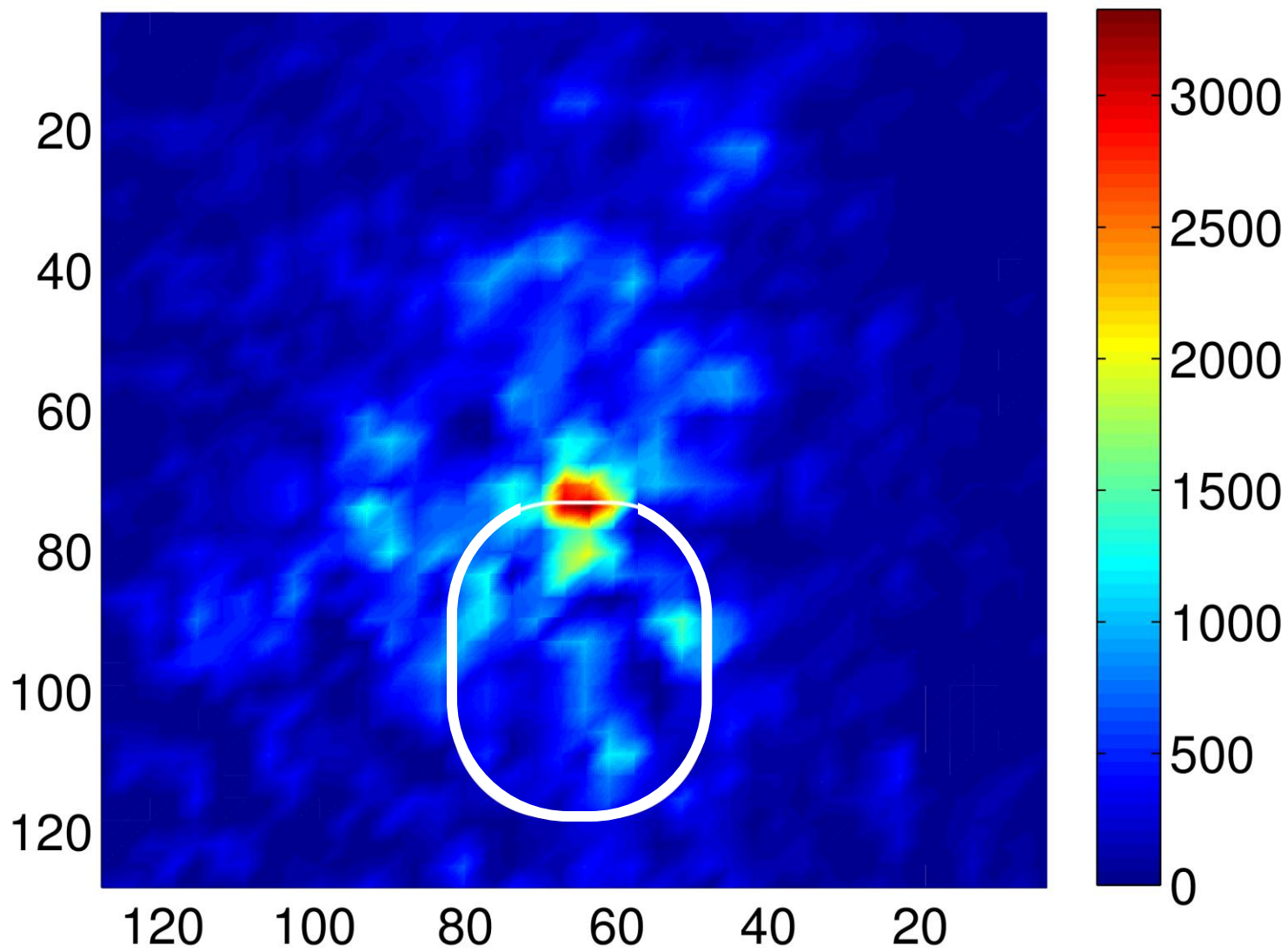
Golfsgeleiders

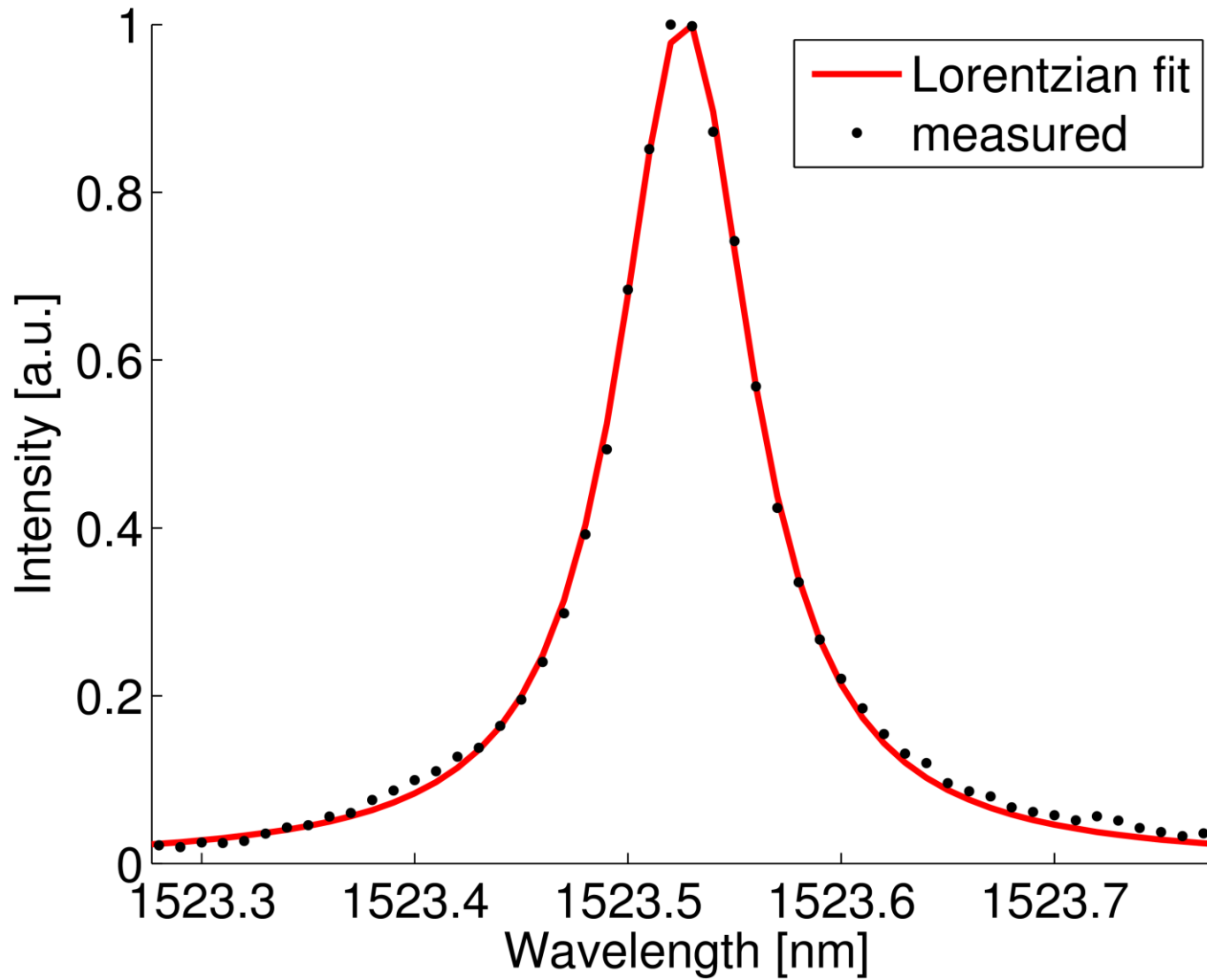


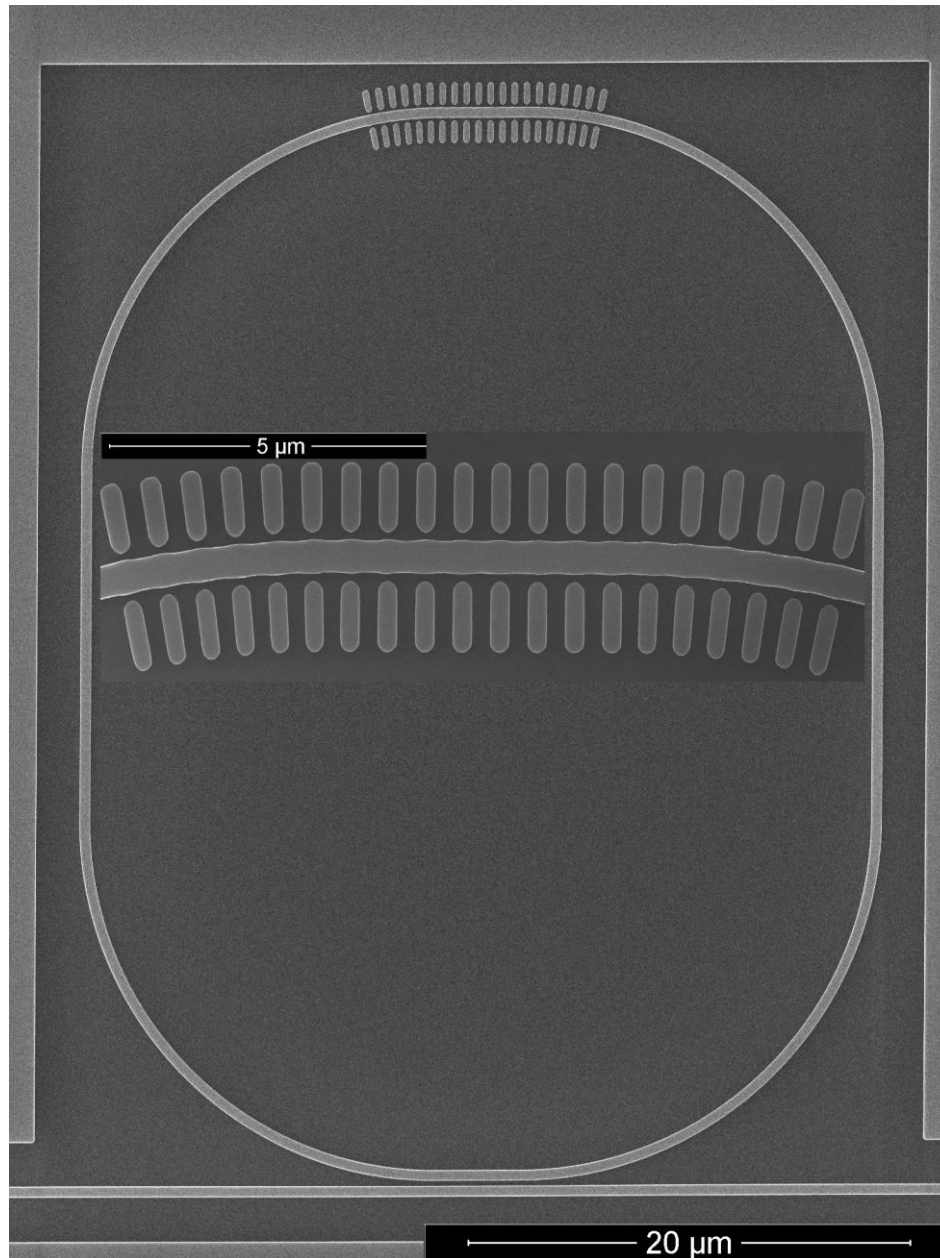












Conclusies

DNA detectie met een microring op een chip

Oplossing voor resonantiesplitsing

Onderdrukking van interferentiesignalen

Rechstreeks opmeten van ring via diffractierooster