



DANISH MEAT
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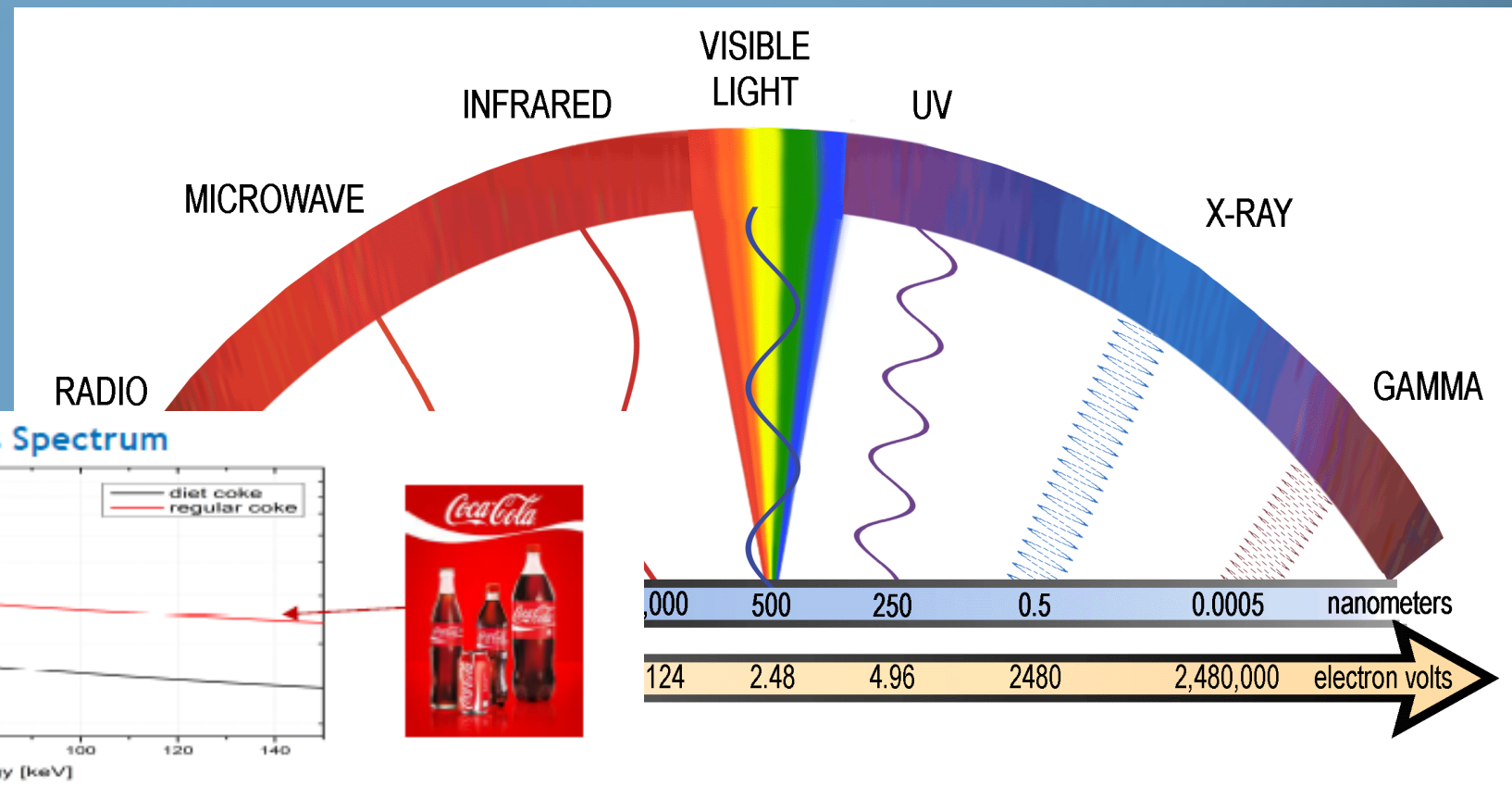
Nye røntgenmetoder til detektion af fremmedlegemer

Lars Bager Christensen

Agenda

Røntgendetektion:

- Problematikken
- Multi-energi
- Darkfield

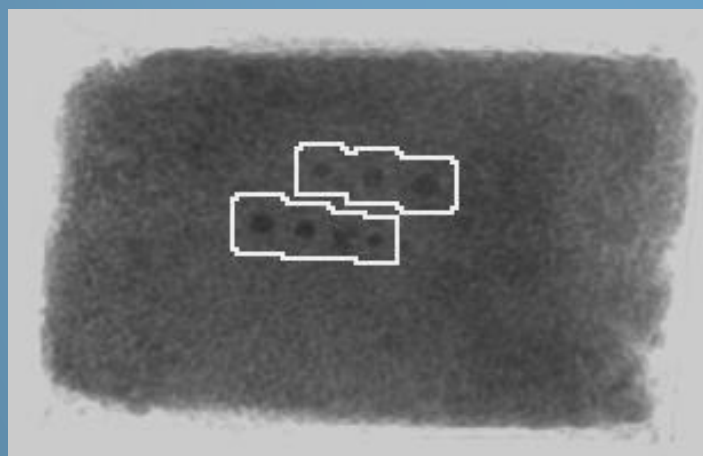
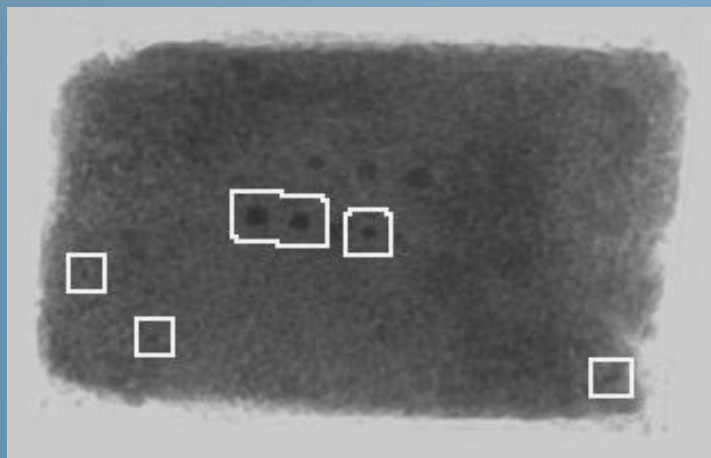


To- energi røntgen

Ishida Cases



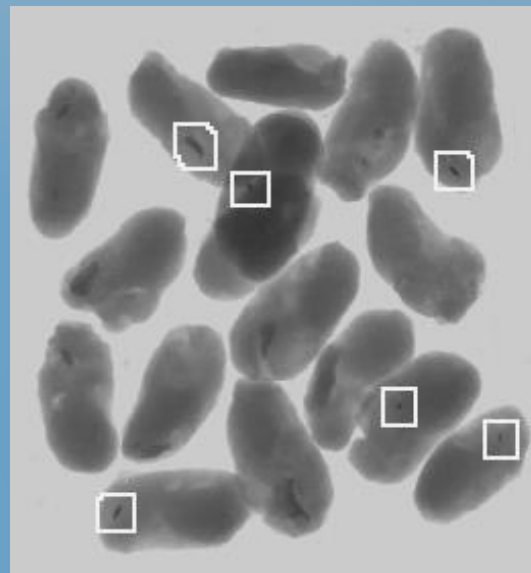
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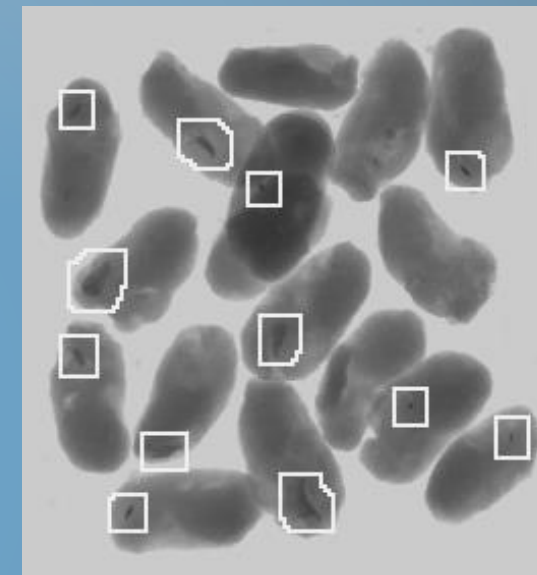
Frozen IQF rice

(SUS: T=0.1mmx D=8,6,4 & 2mm)

(AL: T=1mm x D=8,6,4 & 2mm)



6 pcs. (35%)



12 pcs. (70%)

17 pcs of Natural raw oyster with
thinner shell piece

Forbedret detektion med to-energi

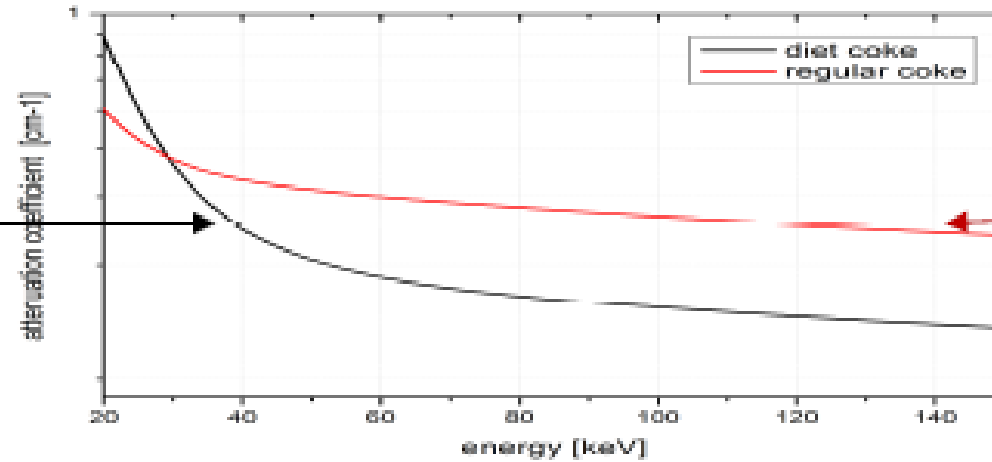
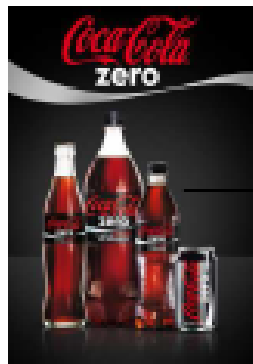
Multi spektral røntgen



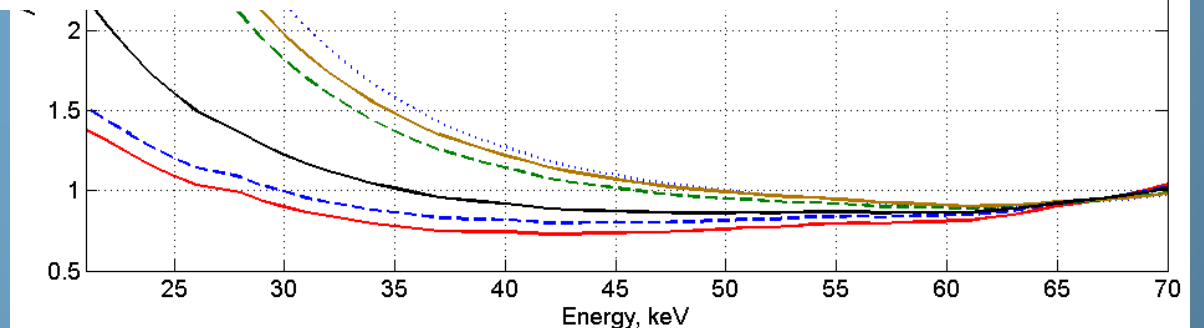
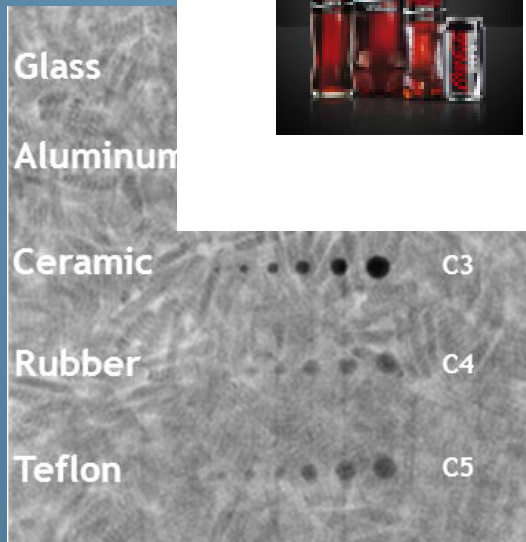
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X-Ray spectra between Coca's are different

Materials Spectrum



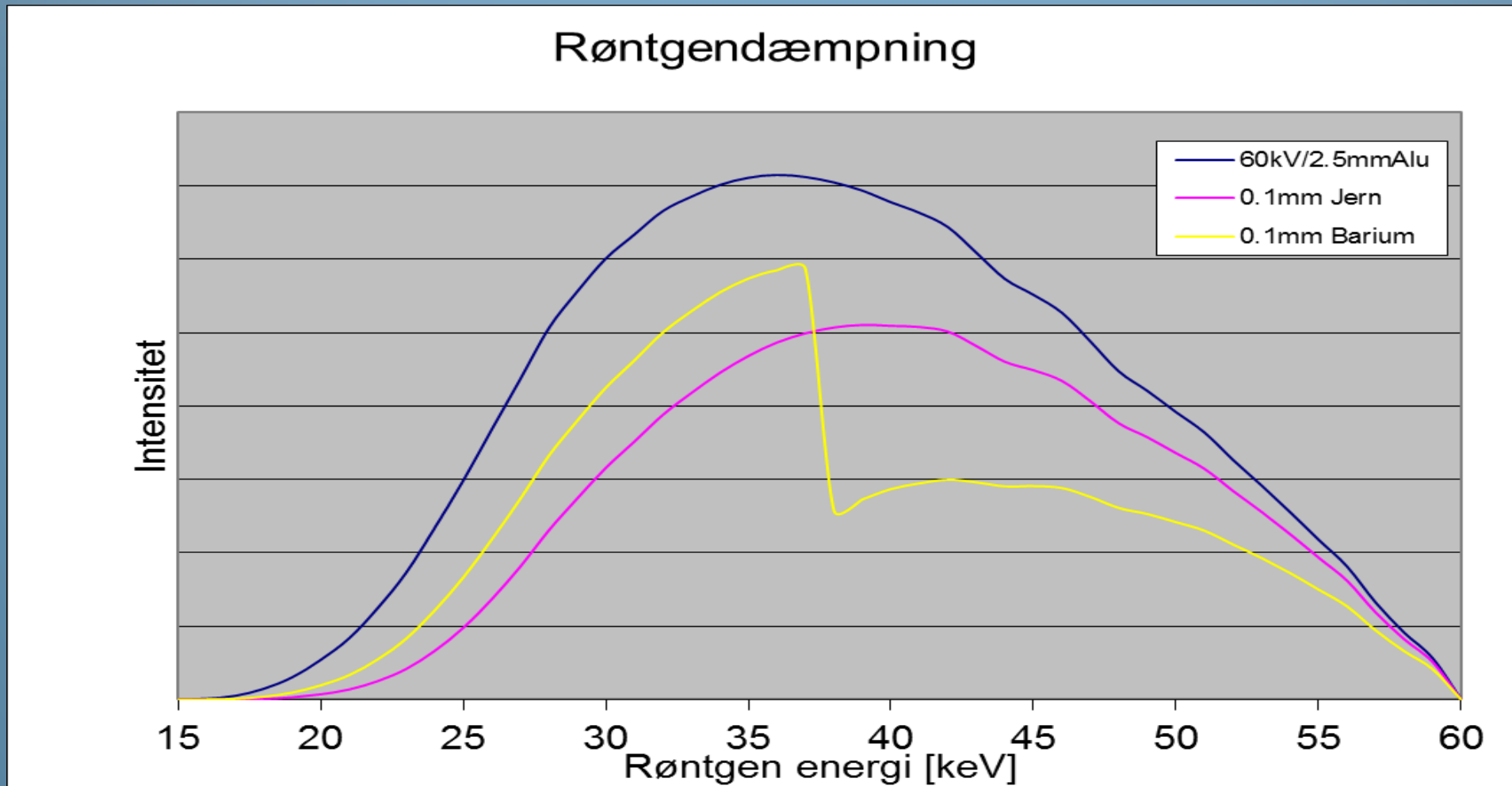
1
3mm
nm
m
n



Materiale dæmpning af røntgen



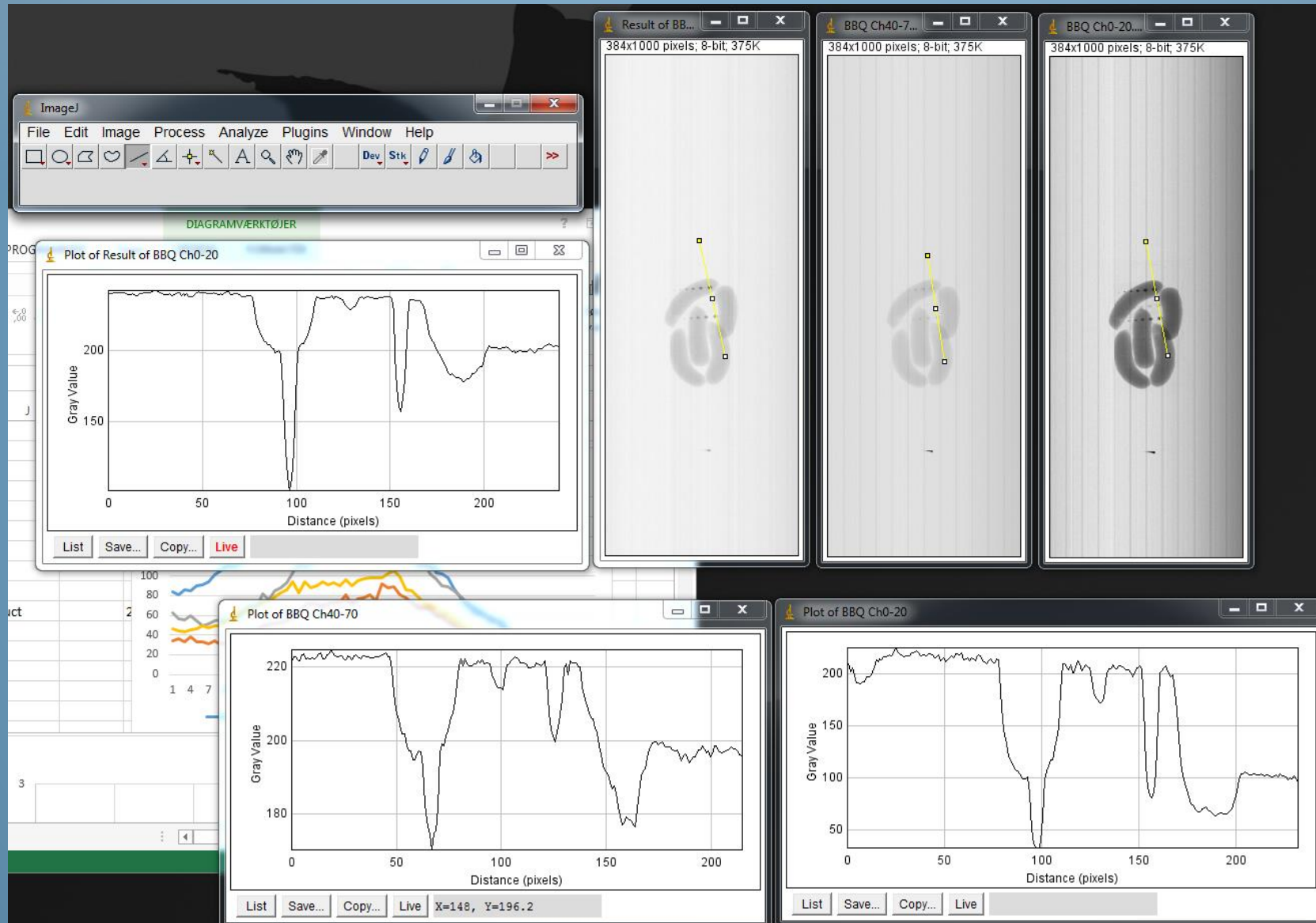
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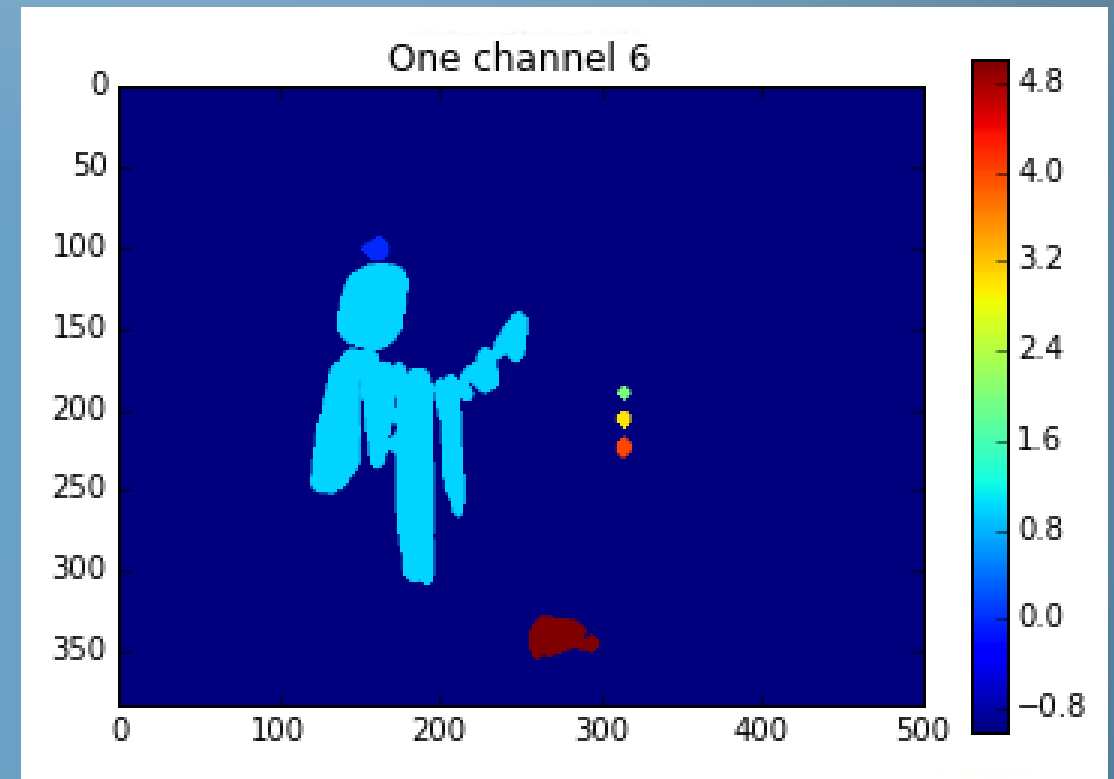
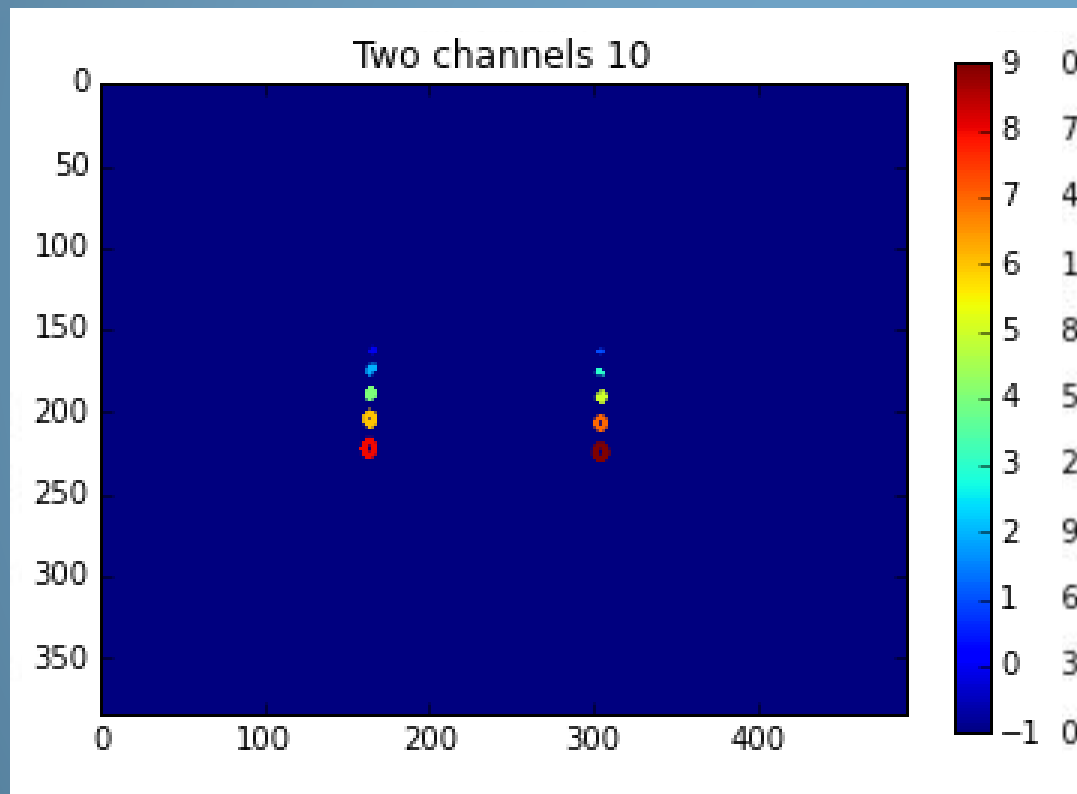
På vej mod en løsning



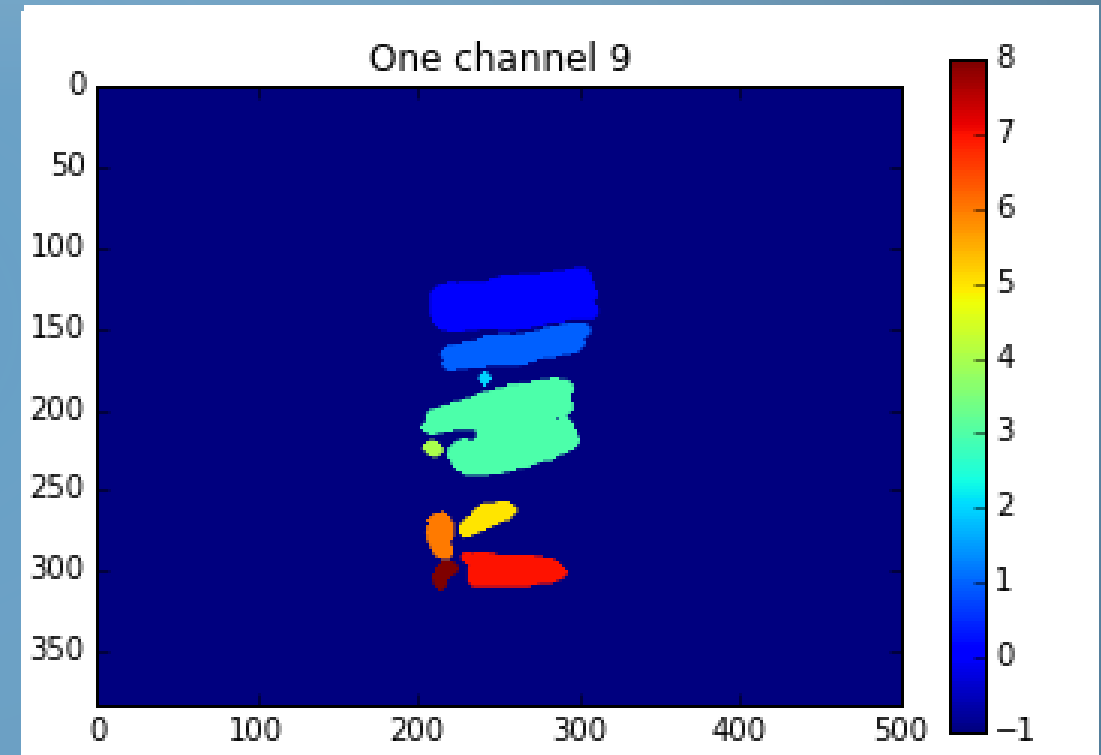
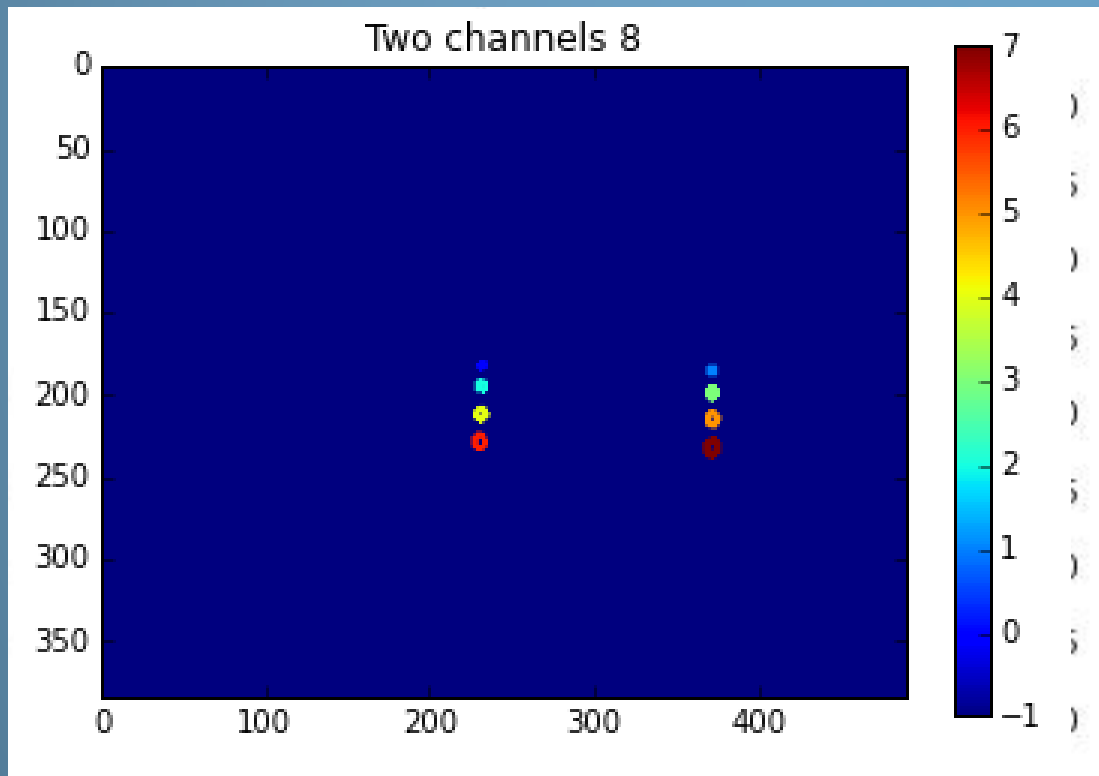
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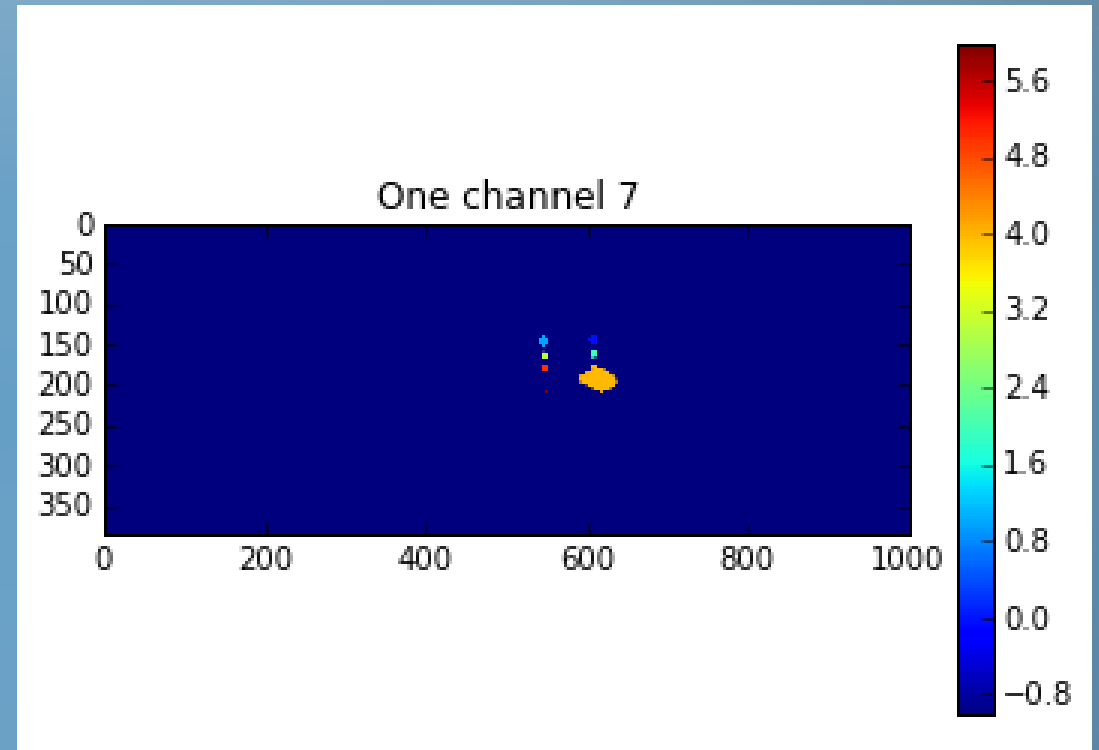
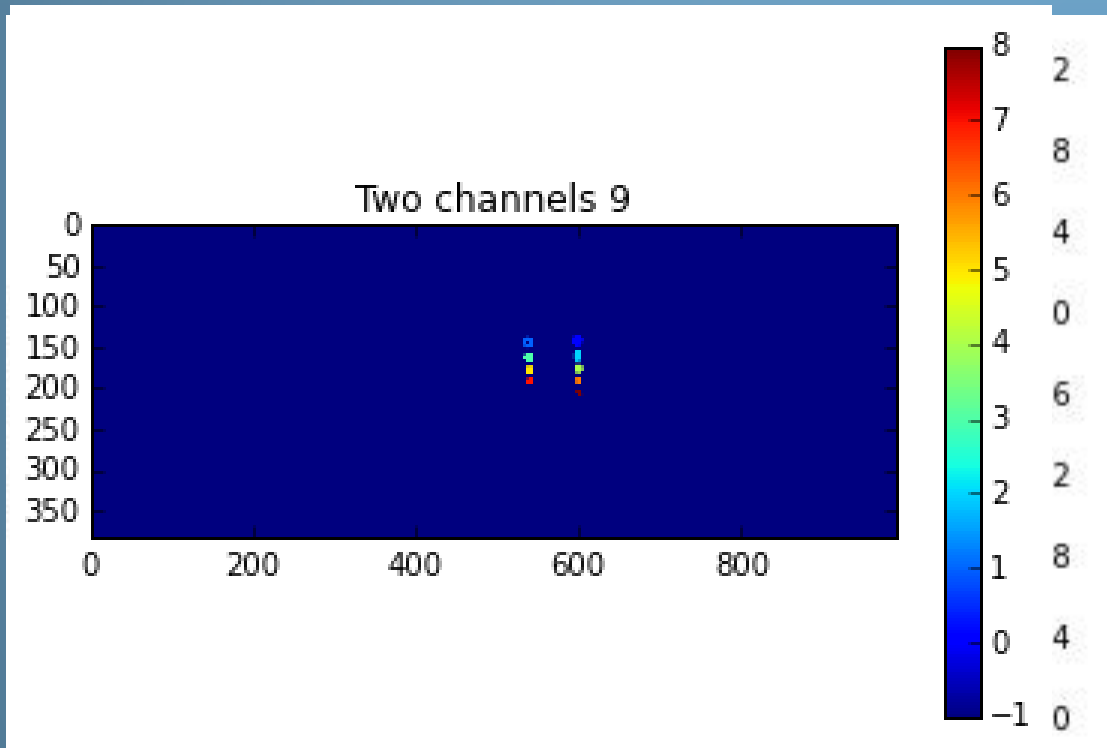
Foreløbige resultater -løstpakkede forårsruller



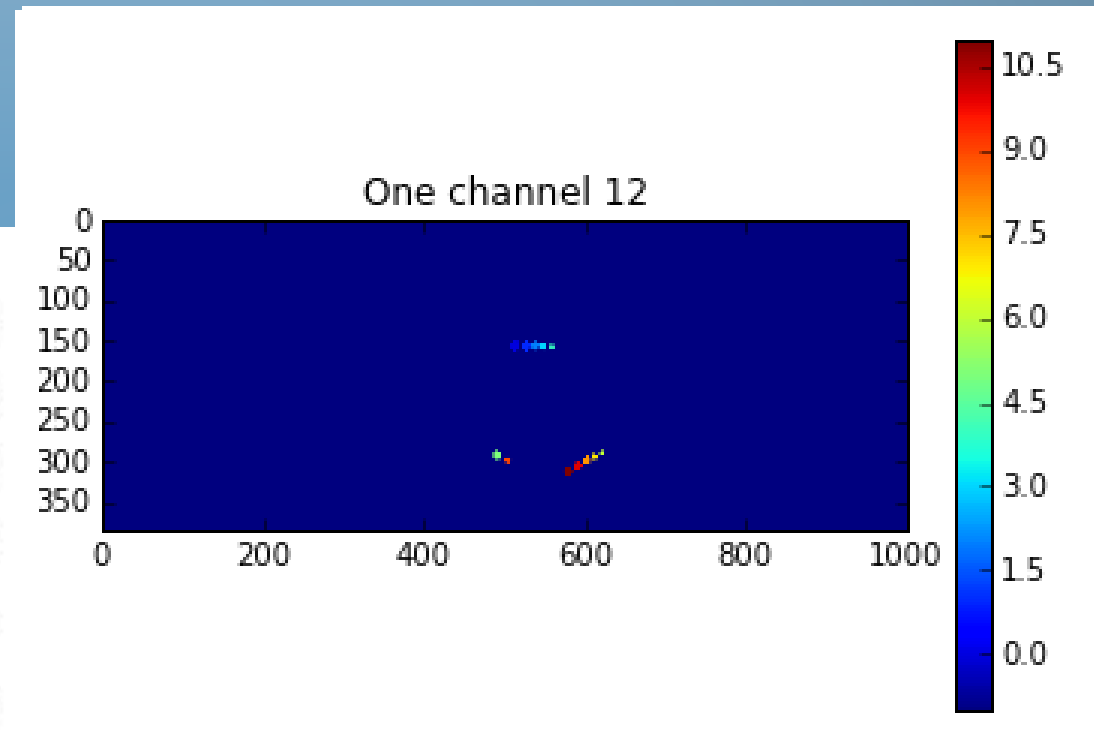
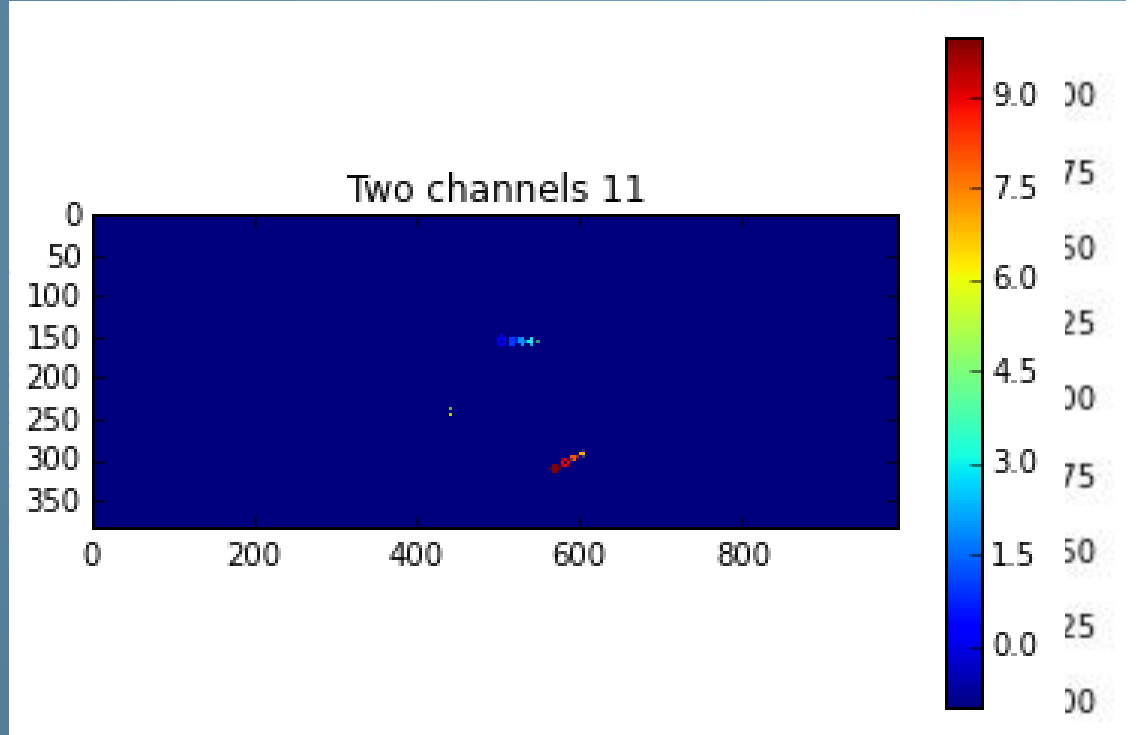
Foreløbige resultater -løstpakkede forårsruller



Foreløbige resultater -løstpakkede pølser



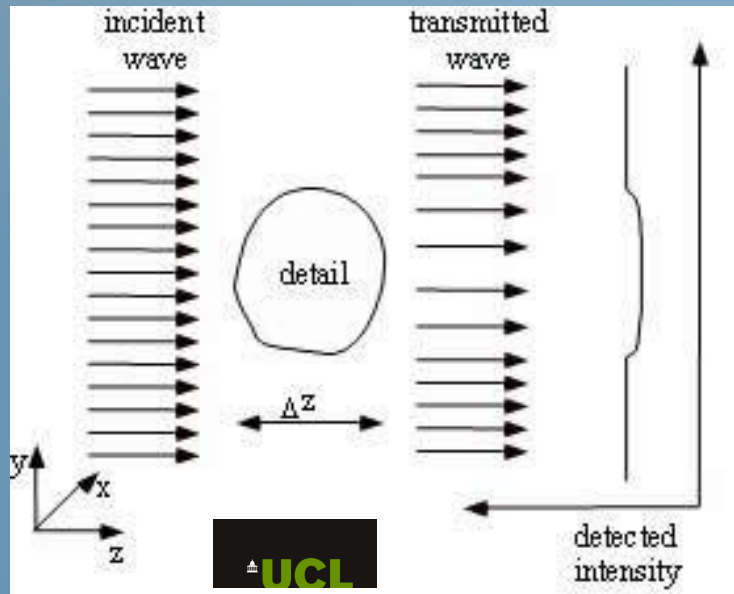
Behov for forskellige metoder



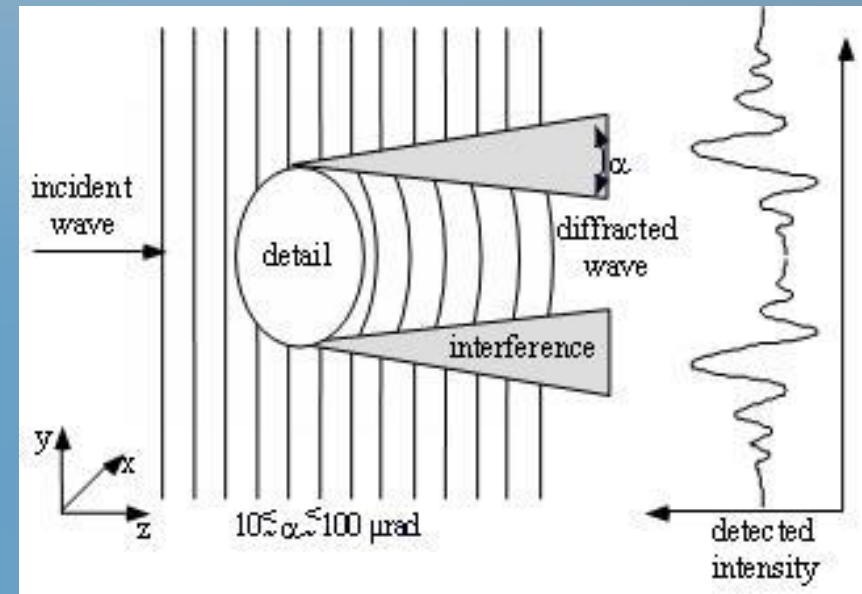
Transmission af røntgen



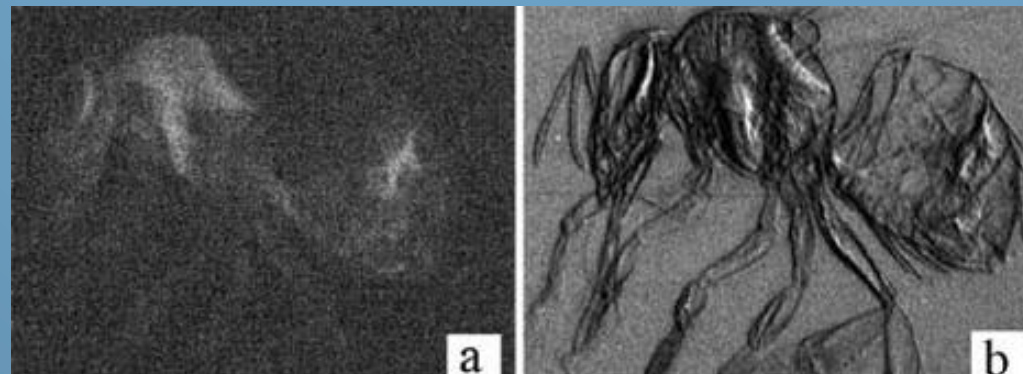
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Attenuation



Delay & diffraction



Forsøg i NEXIM på TUM



Blødt plast (lilla), hårdt plast (lyserød), glas (blå), træ (grøn), hveps (rød), metal ringe (orange), sten (cyan) og gummi (gul).

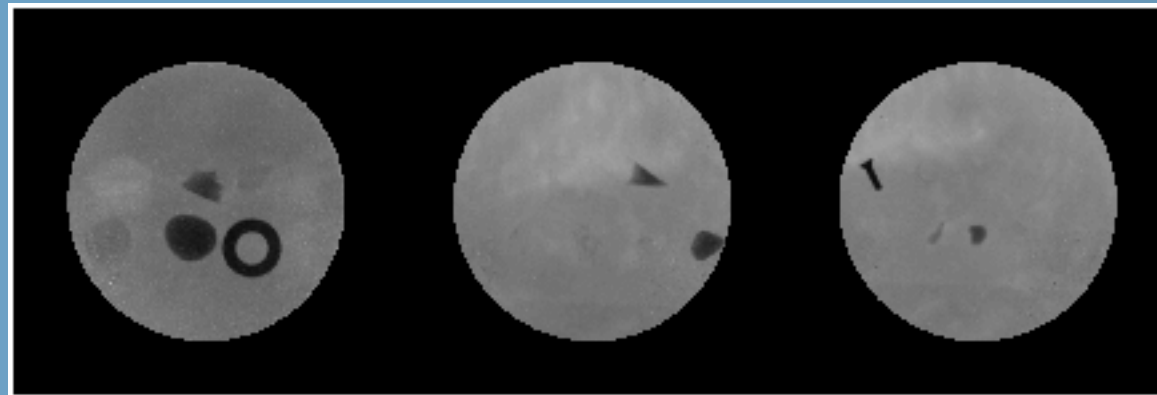
Røntgenskanning



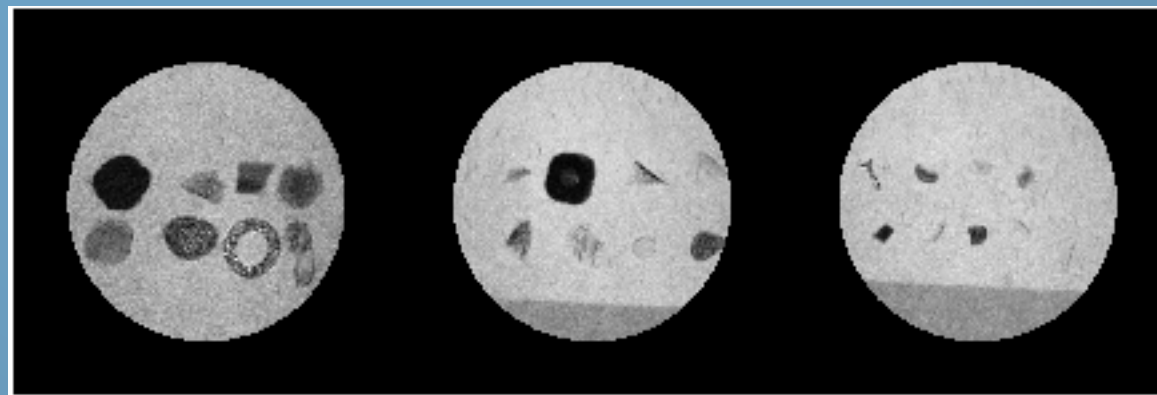
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Absorption



Dark-Field



Konklusion



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- Lave energier detekterer bedst
- Tunge og ledende/magnetiske materialer er "nemmest"
- Multispektral røntgen vil forbedre detektionssikkerheden
- Plastfolie kan pt. kun findes udenpå (DynaCQ)
- Fiberholdige materialer: Dark field røntgen
(i fremtiden, hvis behovet er stort nok)