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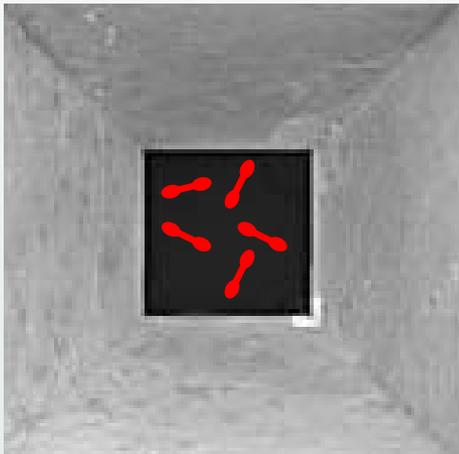
DESY Hamburg

*Coherent Imaging Division*

*Henry Chapman's group*

## Single particle imaging by cryo-ptychography

Fixed target sample ( $\text{Si}_3\text{N}_4$  membrane)



Put several (identical) particles in a view  
Reconstruct them  
Combine many noisy images  
Get the structure

This can be difficult because of phase variation across the beam

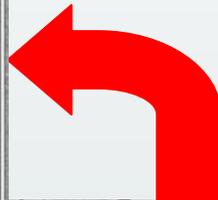
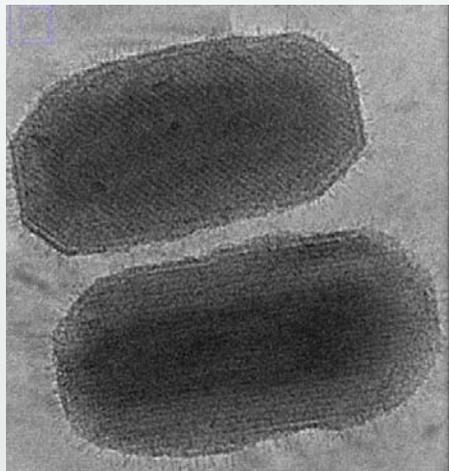
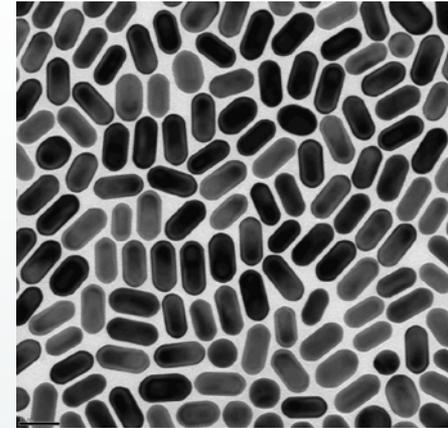
**Ptychography** can help to solve this problem

# Samples

## Inorganic

Au nano or micro-rods

Radiation hard, several sizes available



**Cryo-stage necessary**

## Biological

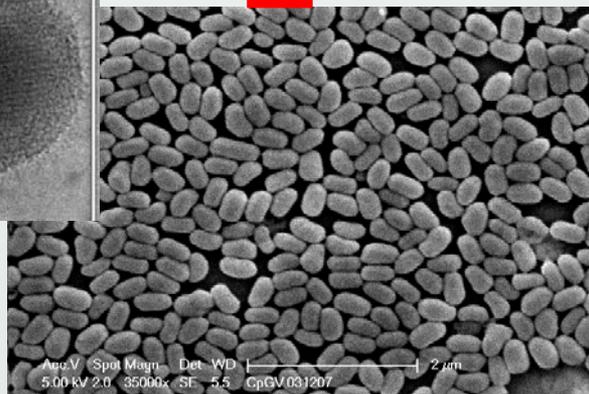
Granulovirus

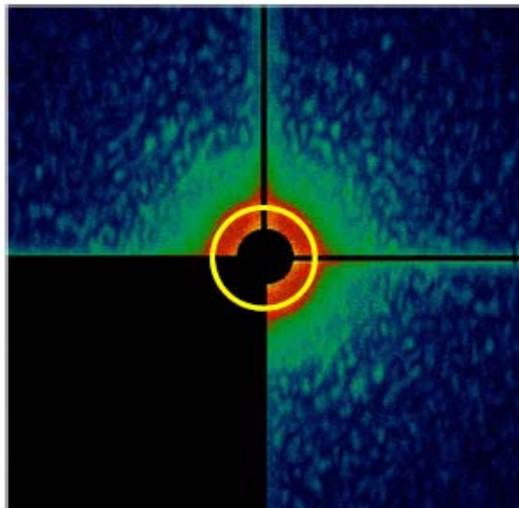
Viral core,

protein crystalloid part

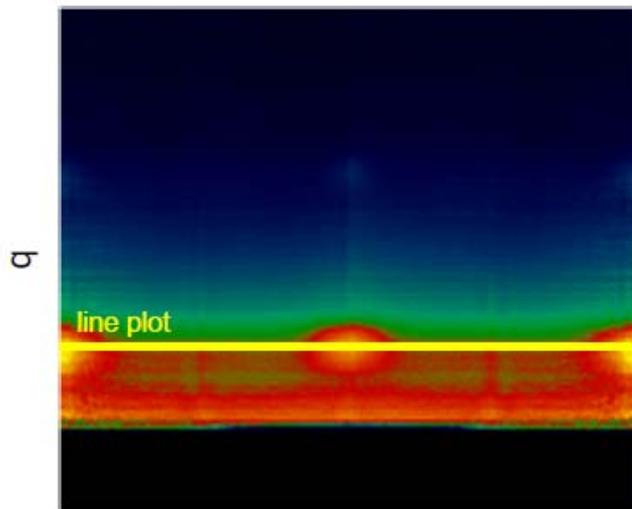
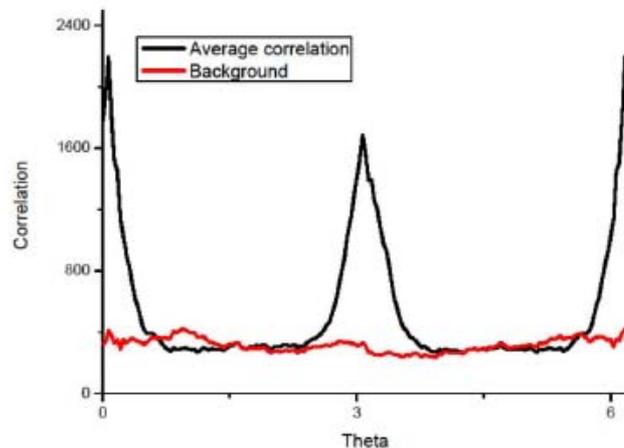
~300 nm size

In collaboration with Peter Metcalf  
(University of Auckland) *et al.*

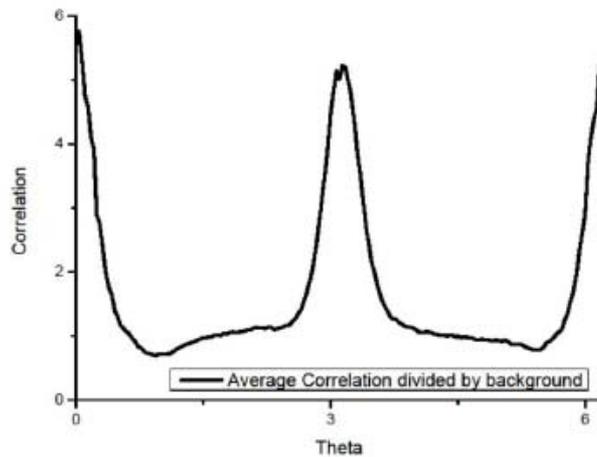




Petra3 5/2011: Au Microrods (200x1000) 20%Glycerol Sample12



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Theta (0-2pi)