

# Phase Contrast X-ray Imaging

Workshop on Non-destructive Inspection Technologies

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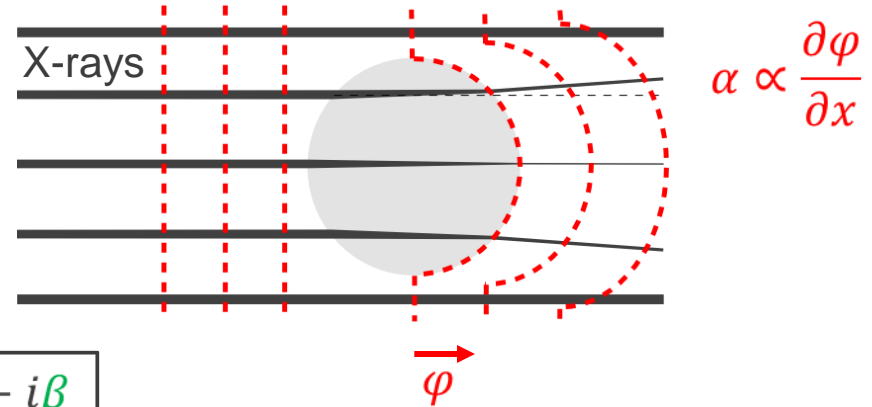
8005 Zurich

# Absorption Imaging vs. Phase Contrast Imaging

## Absorption



## Phase Shift

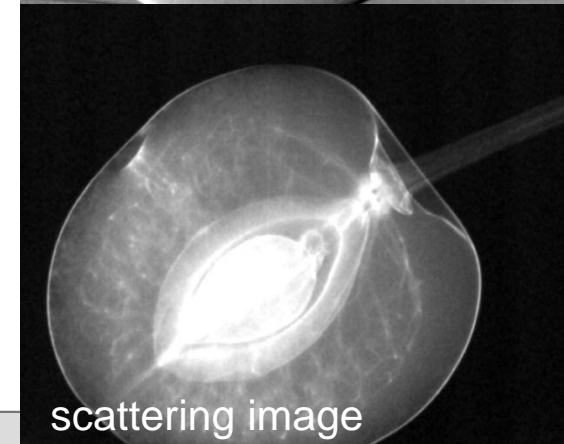
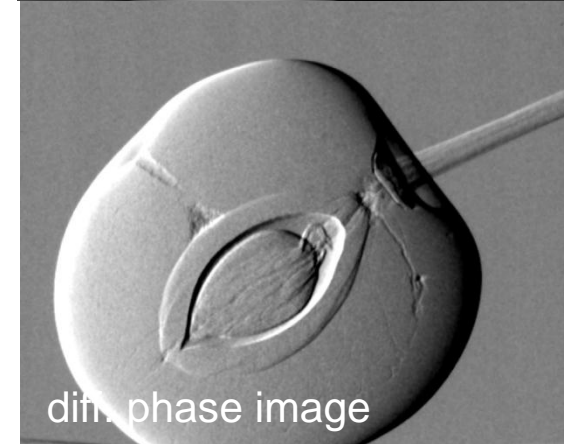
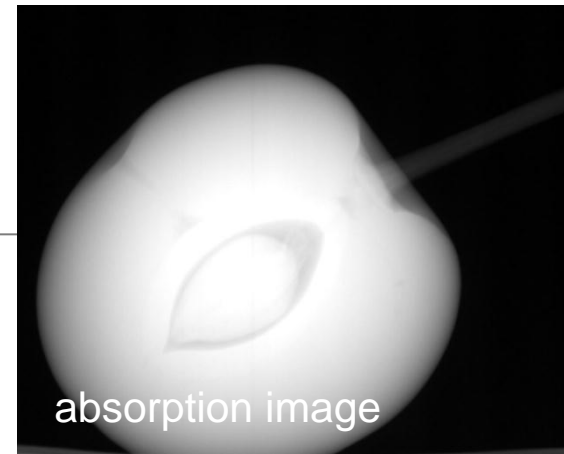


$$n = 1 - \delta + i\beta$$

- Measured quantity:  $\alpha$
- => spatial derivative of the phase shift  $\varphi$  => integral of  $\delta$  along beam axis
- Measurement technique: Interferometer

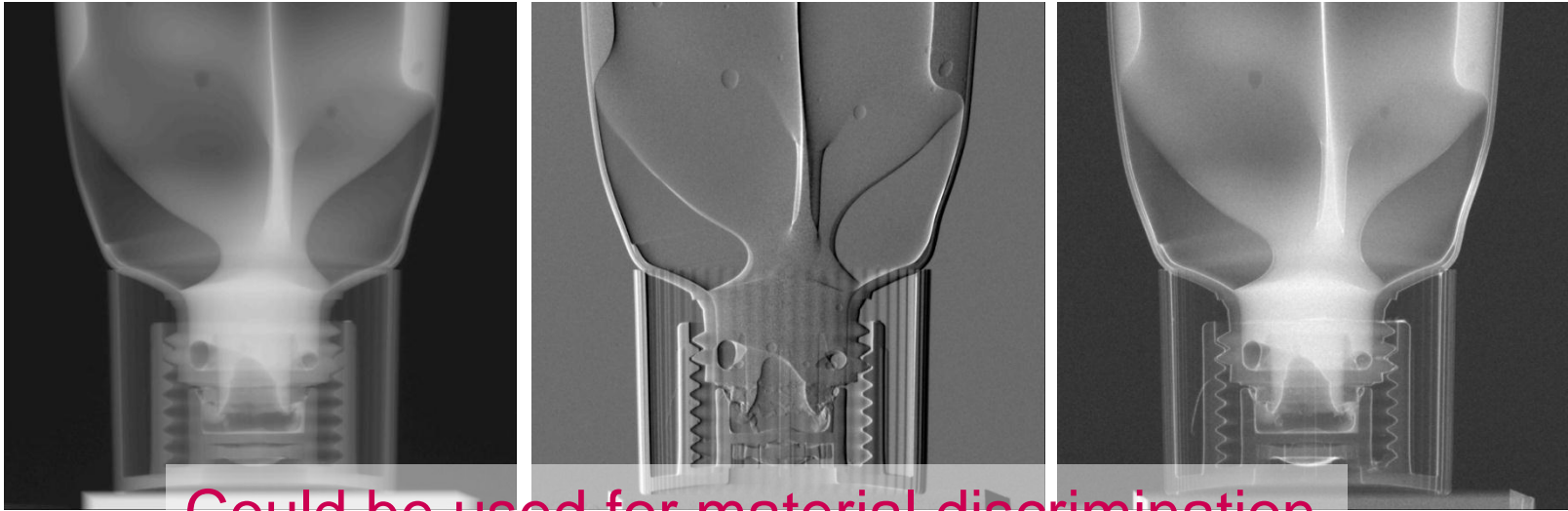
# Three Information Channels by One Measurement

- Classical absorption image:  
mainly strongly absorbing objects
- Diff. phase image:  
weakly and strongly absorbing objects
- Dark field image (scattering image):  
microstructure of the objects



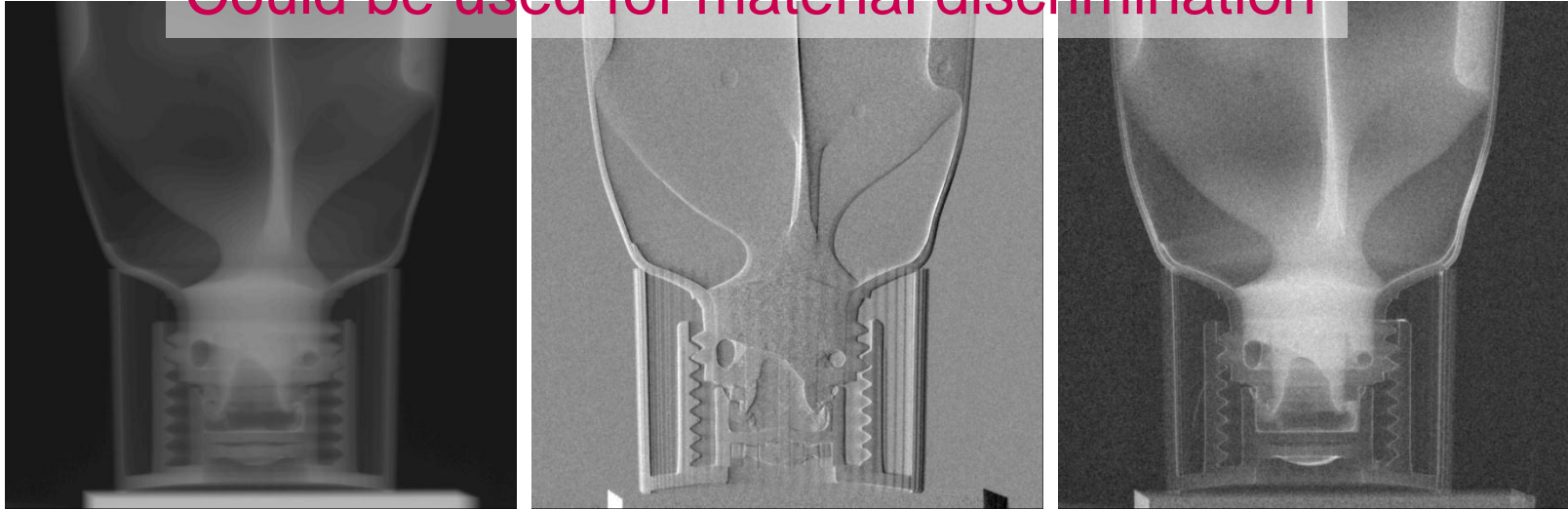
# Toothpaste: Dual Energy Imaging With One Set of Gratings

40kV



Could be used for material discrimination

70kV





**Thank you for your attention.**