

X-ray microtomography

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Hello!

- Office B311 | haberthuer@ana.unibe.ch
- Master in Physics, then PhD in high resolution imaging of the lung at the Institute of Anatomy
- Post-Doc at the TOMCAT beamline of the Swiss Light Source at the Paul Scherrer Institute
- Post-Doc at the Institute of Anatomy in the μ CT-group
 - Ruslan Hlushchuk, David Haberthür, Oleksiy-Zakhar Khoma, Fluri Wieland, Carlos Correa Shokiche
- Biomedical research
 - microangioCT [1]: Tumor vasculature, angiogenesis in the heart, musculature and bones
 - Cancer research: Melanoma
 - Lung imaging: Tumor detection and classification
 - Physiology: Zebrafish musculature and gills [2]
 - SkyScan 1172 & 1272

[1] Hlushchuk2018.

[2] Messerli2019.

Contents

Biomedical imaging

Imaging

- Tomography

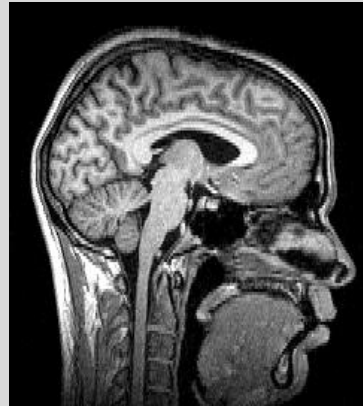
- X-ray production


- Interaction of x-rays with matter

- History

Biomedical imaging

- Medical research



w.wiki/7g4 

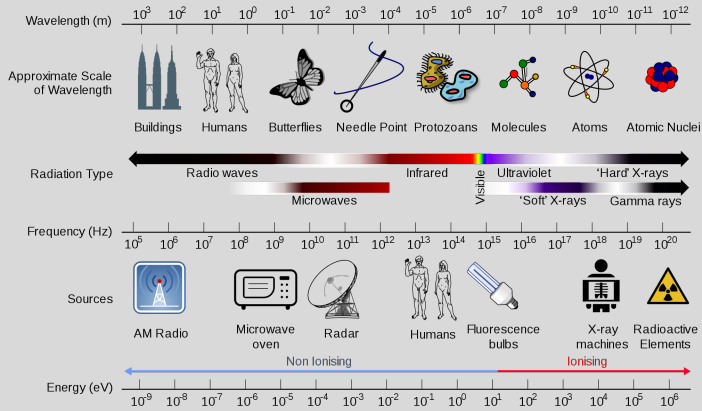
Biomedical imaging

- Medical research
- (Small) Biological samples

Biomedical imaging

- Medical research
- (Small) Biological samples
- Non-destructive insights into the samples

Wavelength & Scale



w.wiki/7fz

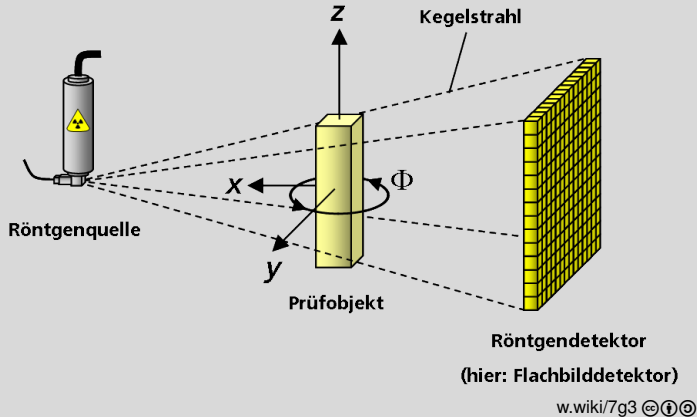
Imaging methods

- Light microscopy: see lecture of Nadia Mercader Huber
- X-ray imaging
- Electron microscopy: see lectures on Transmission Electron Microscopy by Dimitri Vanhecke, Scanning Electron Microscopy by Michael Stoffel and Cryoelectron Microscopy & Serial Block Face SEM by Ioan Iacovache.

CT-Scanner

youtu.be/2CWpZKuy-NE

What is happening?



X-ray generation

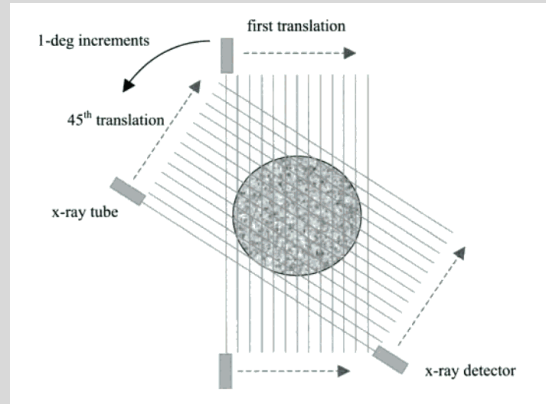
- How are x-rays generated
- Why do we need them

History

- Some history is found in [**Cormack1963**,
Hsieh2003]

History

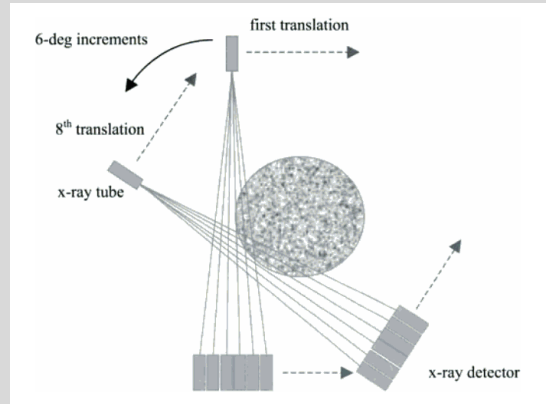
- Some history is found in [**Cormack1963**, **Hsieh2003**]
- First, second and third generation of scanners



From [**Hsieh2003**], Figure 1.12

History

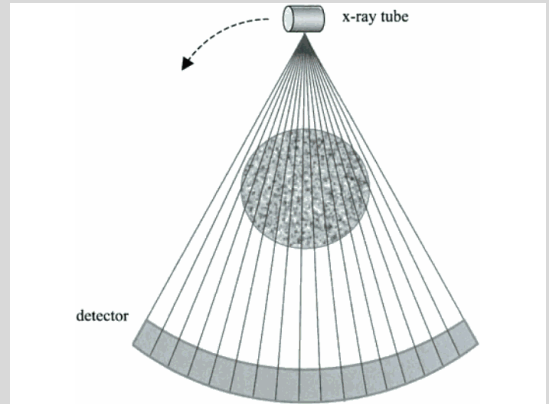
- Some history is found in [**Cormack1963**, **Hsieh2003**]
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From [**Hsieh2003**], Figure 1.13

History

- Some history is found in [**Cormack1963**, **Hsieh2003**]
- First, second and third generation of scanners



From [**Hsieh2003**], Figure 1.14