Photon-counting CT

Future Prospects in Trauma

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Trauma Applications

- Head
  - Detection of hemorrhages and ischemic changes
- Chest
  - Pulmonary structures
  - Lung contusions, pneumothorax, mediastinal injuries
- Abdominal and Pelvic
  - Solid organs (liver, spleen, kidneys)
  - Internal bleeding, vascular injuries, organ damage
- Spine and Extremity
  - Spine injuries
  - Complex fractures, soft tissue injuries
- Pediatric
  - Radiation dose reduction
  - Imaging small anatomical structures
- Geriatric
  - Reduced iodine dose

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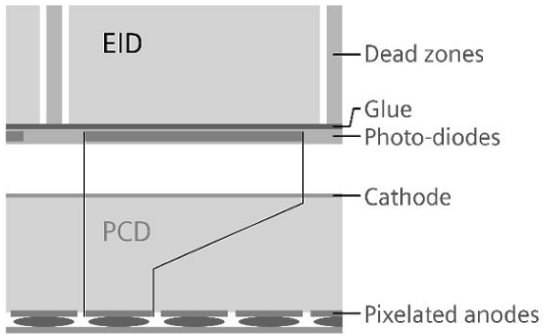
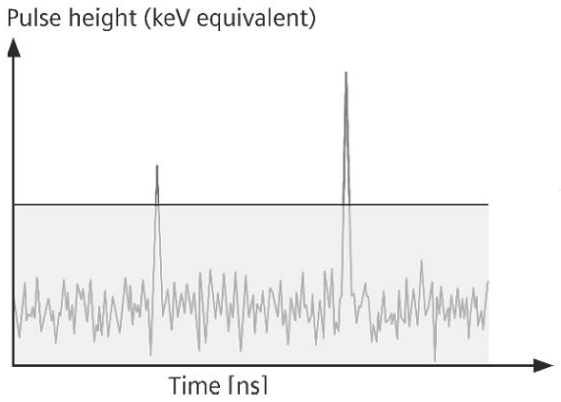
Benefits of PCCT



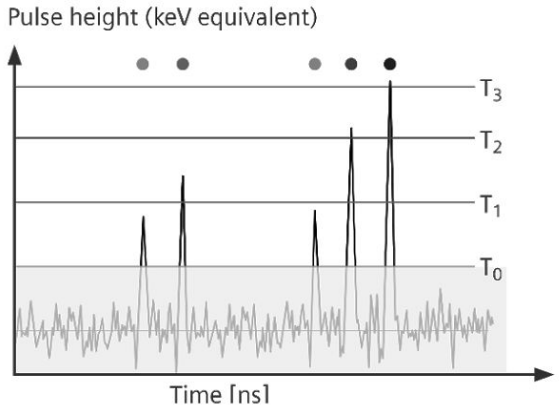
Smaller pixels

Higher resolution



No background noise

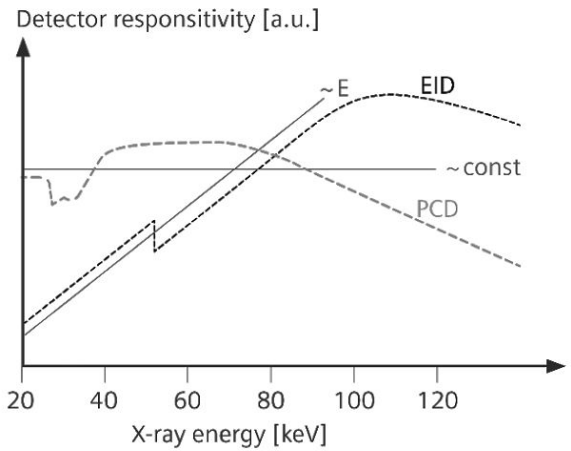
Lower radiation dose



Multiple Energy levels

Always Dual Energy
Quantitative

Faster scans (13x)



Higher sensitivity

Lower IV contrast
(80% lower)

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Challenges with CT imaging

- Image quality challenges
  - Soft tissue differentiation
  - Spatial resolution: Complex fractures, small bone fragments, inner ear structures
  - Temporal resolution: Motion artifacts
  - Overweight patients
  - Beam hardening and metal artifacts: dense material
- IV contrast
  - Decreased Renal Clearance
  - Allergy
- Radiation exposure
  - Pediatric / Pregnant
  - Follow-up studies and cancer screening

Clinical benefits of PCCT

- Higher spatial resolution
- Higher low contrast detectability
- Lower IV contrast
- Lower radiation dose
- Better 3 material decomposition
  - Iodine / VNC maps
  - Bone marrow edema

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Clinical benefits of Siemens NAEOTOM Alpha

- Higher total tube output
- Water cooling
- Rapid Multi-Phase Imaging
- Bore size 82 cm
- 3D camera positioning → 1 shorter topogram
- Workflow automation:
  - Planning
  - Contrast injection
  - Rapid results:
    - MPR, MIP, Labeling, Dual Energy, Perfusion, 3D

240 kW	Siemens NAEOTOM Alpha / SOMATOM Force
120 kW	Philips Spectral CT 7500
108 kW	Revolution Apex Elite
100 kW	Canon AQUILION One

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Summary

What is photon-counting CT?

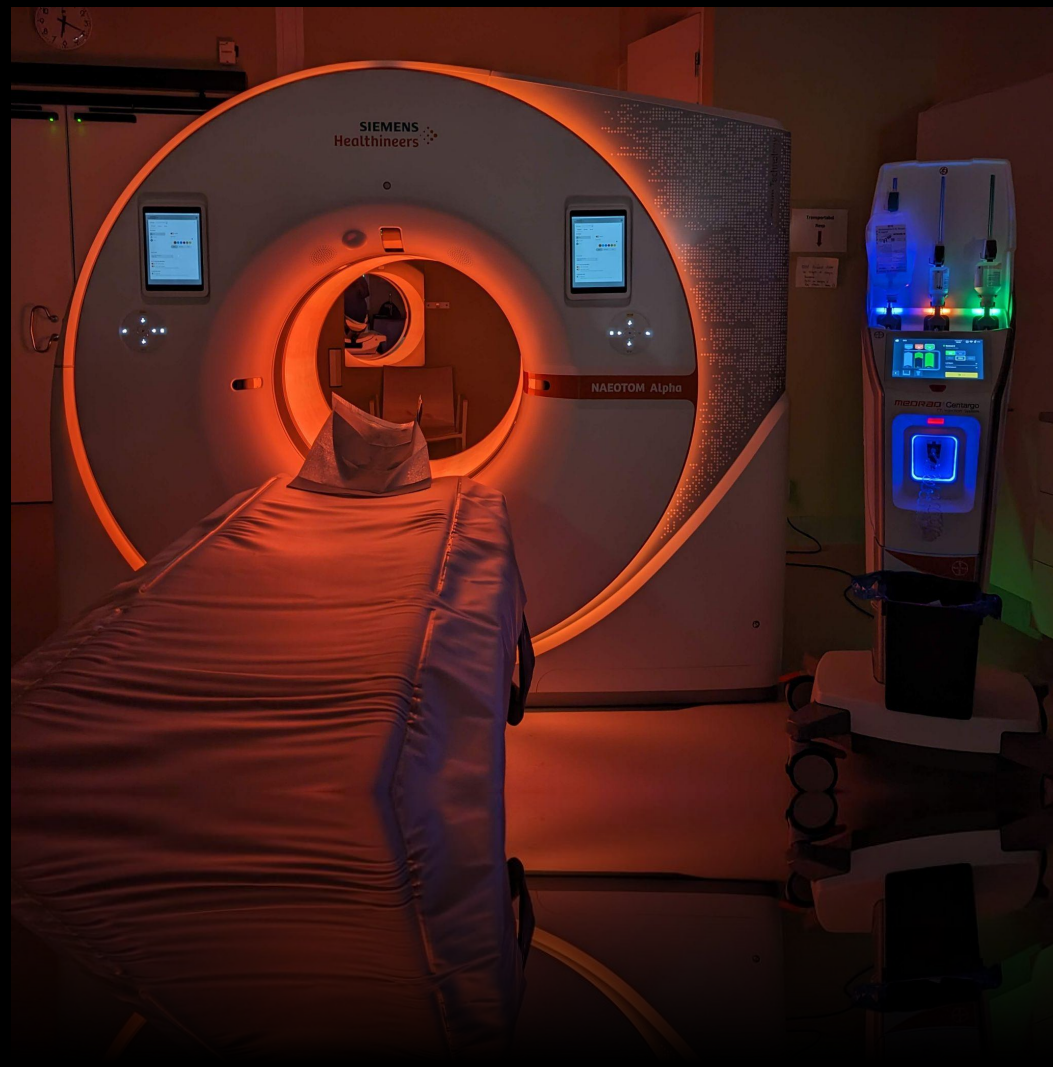
- Next-generation

Why is it needed?

- Lower radiation dose
- Lower contrast medium dose
- Better spatial resolution
- More stable HU values
- Monoenergetic Imaging

Is it just for research?

- No! Clinically approved with real clinical benefits



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