Probability density-based image reconstruction for proton Computed Tomography

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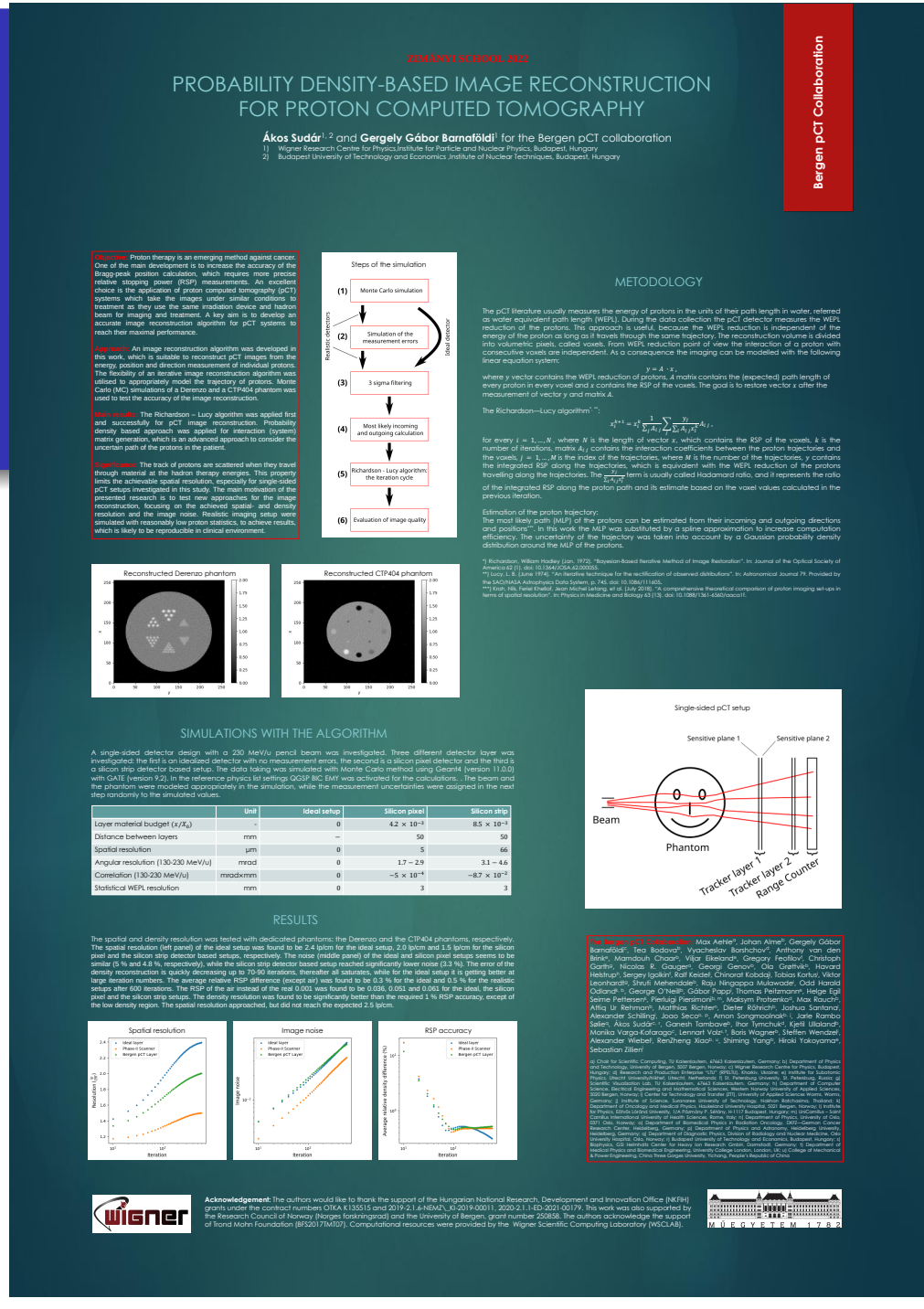
on behalf of Bergen proton CT collaboration (full collaboration list)

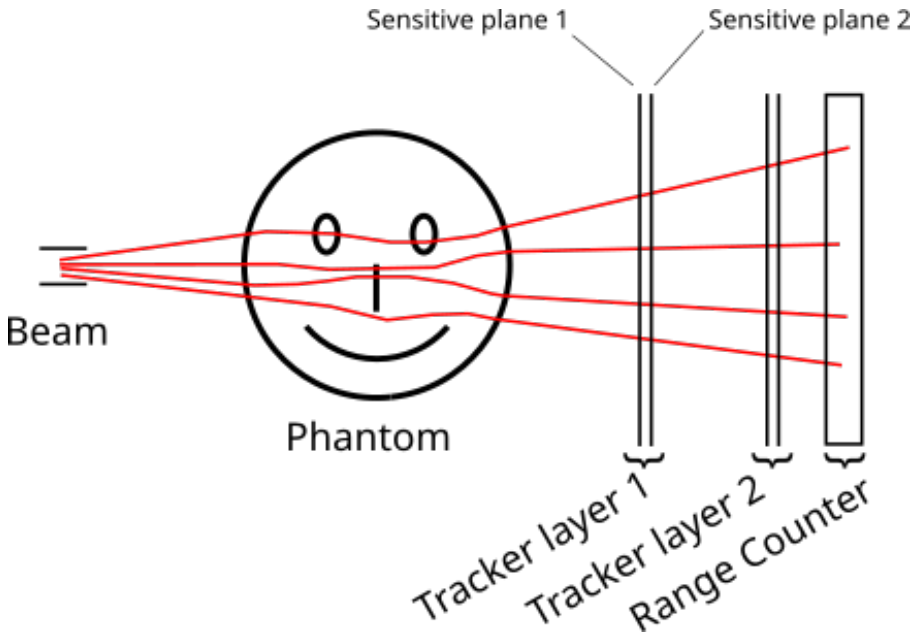
Zimányi Winter School 2022, 8 Dec 2022

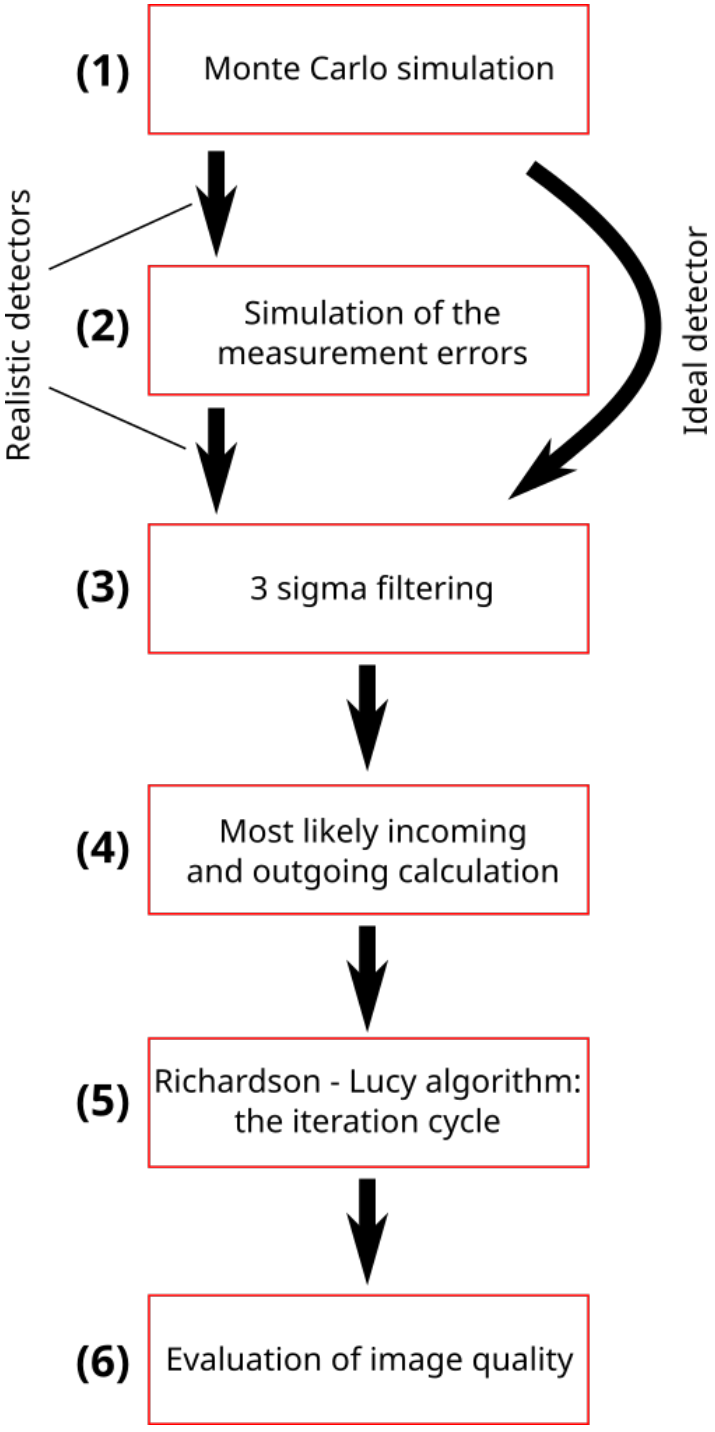


Novel points:

- Richardson – Lucy algorithm (first applied for pCT)
- Probability-density based trajectory model
- Measurement uncertainties in most likely path calculations

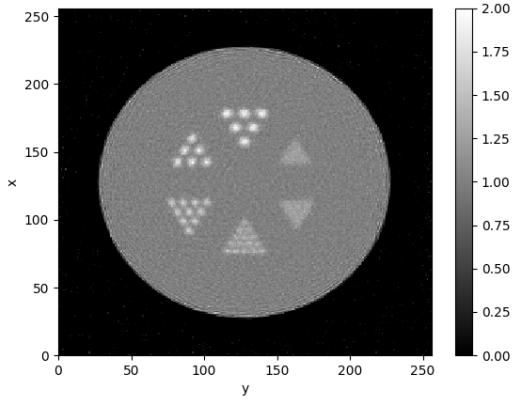
Single-sided setup:

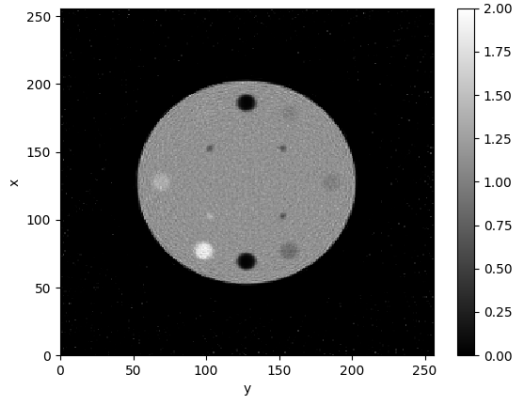




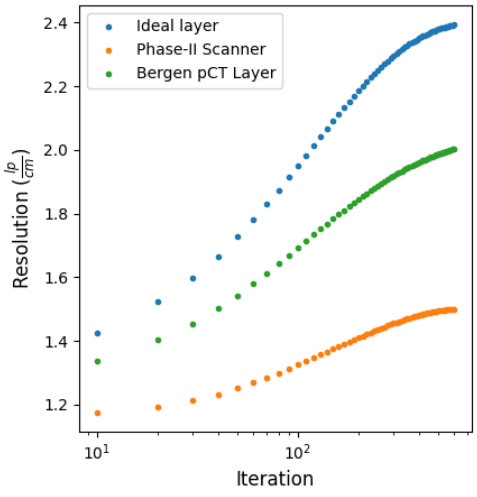
Results:

- Spatial resolution ($MTF_{10\%}$):
  ideal: 2.4 lp/cm & realistic: 2.0 lp/cm
- Relative stopping power (RSP) accuracy:
  0.3 % for ideal & 0.5 % for realistic setup
- Image noise: around 5 % for both cases

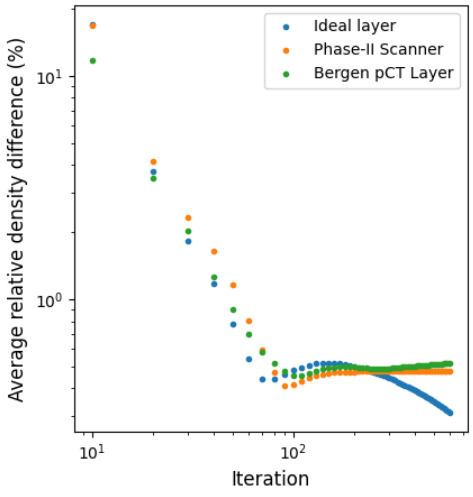




Spatial resolution



RSP accuracy



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