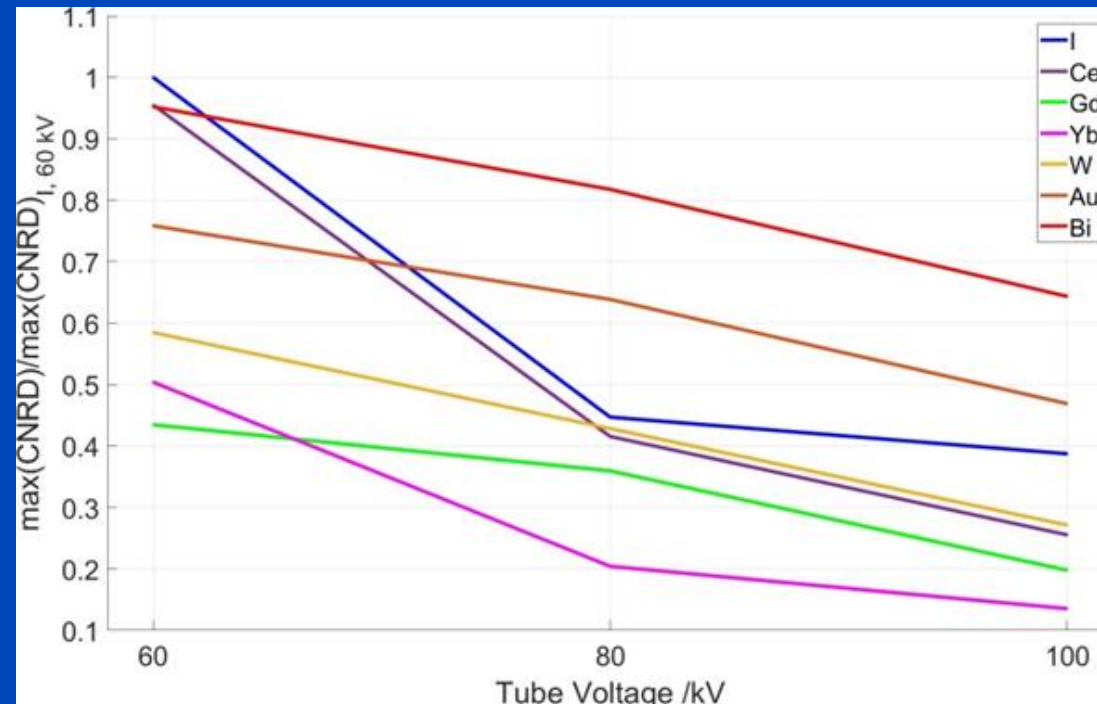


Decomposition of Multiple Contrast Agents in Photon-Counting Micro-CT: Iodine and Bismuth

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Iodine and bismuth are individually the best performing elements for material decomposition in micro-CT¹. How do they cope together?



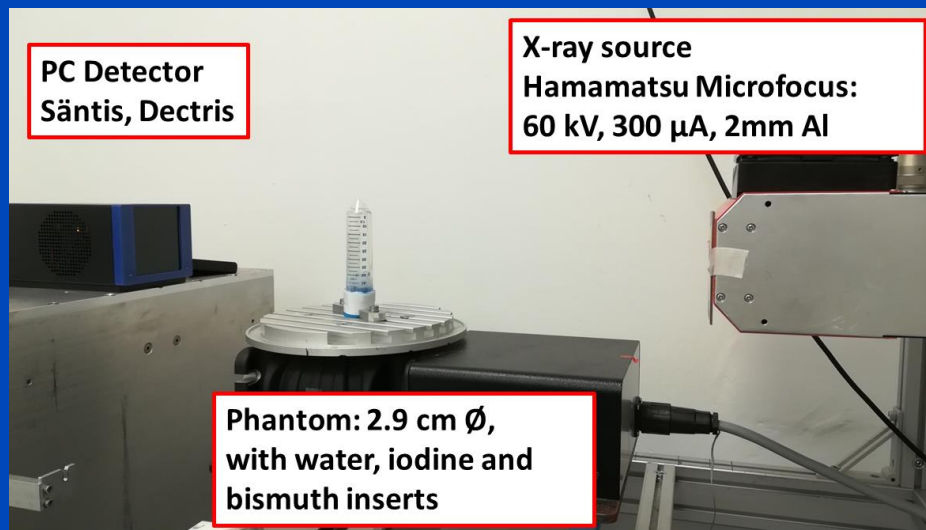
Maximum CNRD of the material decomposition as a function of the tube voltage for each investigated contrast medium



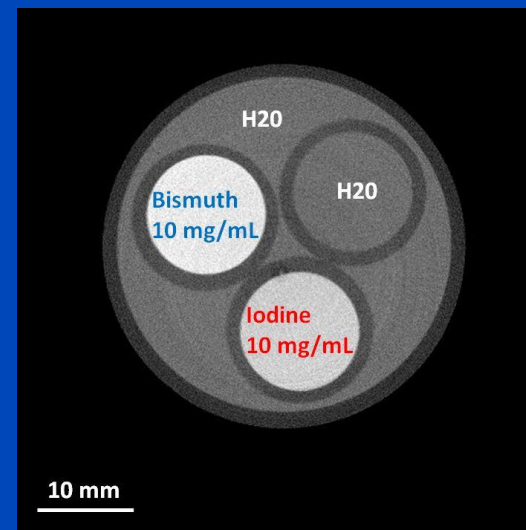
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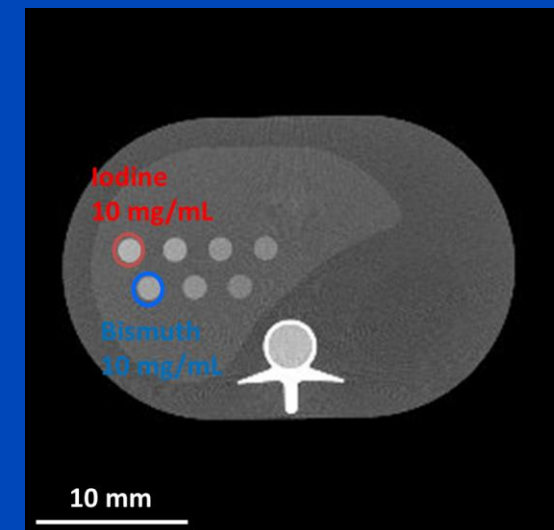
Measurements and simulations of micro PCCT with two energy thresholds.



Setup



Measurement



Simulation

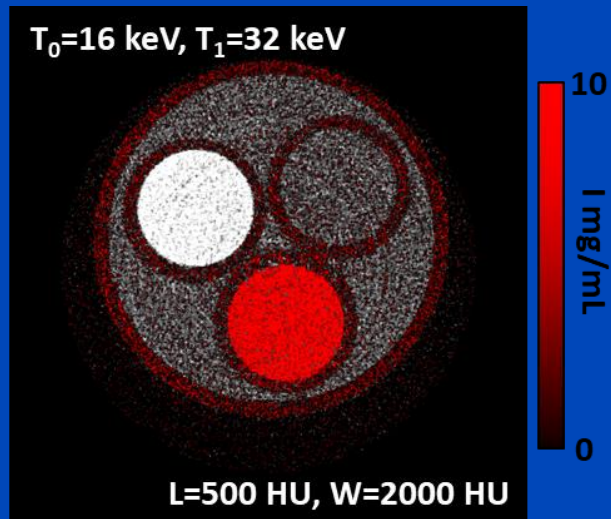
Bin images are generated for all the possible combinations of the two energy thresholds.

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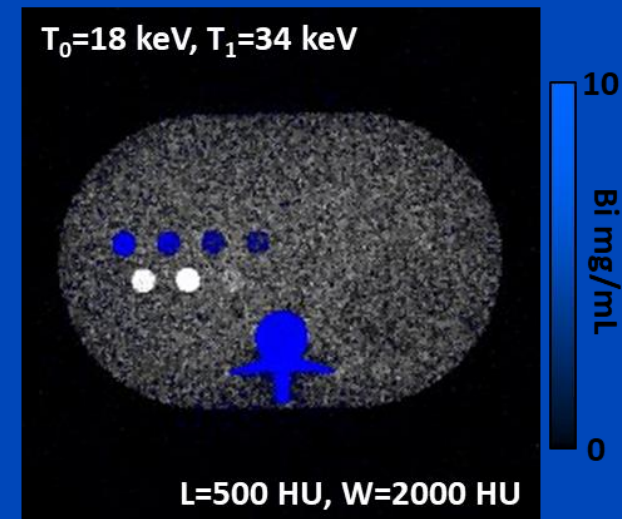
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Spyridon Gkoumas, Thomas Thüring, Andreas Briel, Christian Brönnimann, and Marc Kachelrieß

Material decomposition of water and iodine/bismuth is performed.

Examples:



Water/iodine decomposition (Meas)



Water/bismuth decomposition (SIIm)

The CNR is evaluated in the material map of the high-z element.

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CNR as a function of the two energy thresholds.
Simulations:

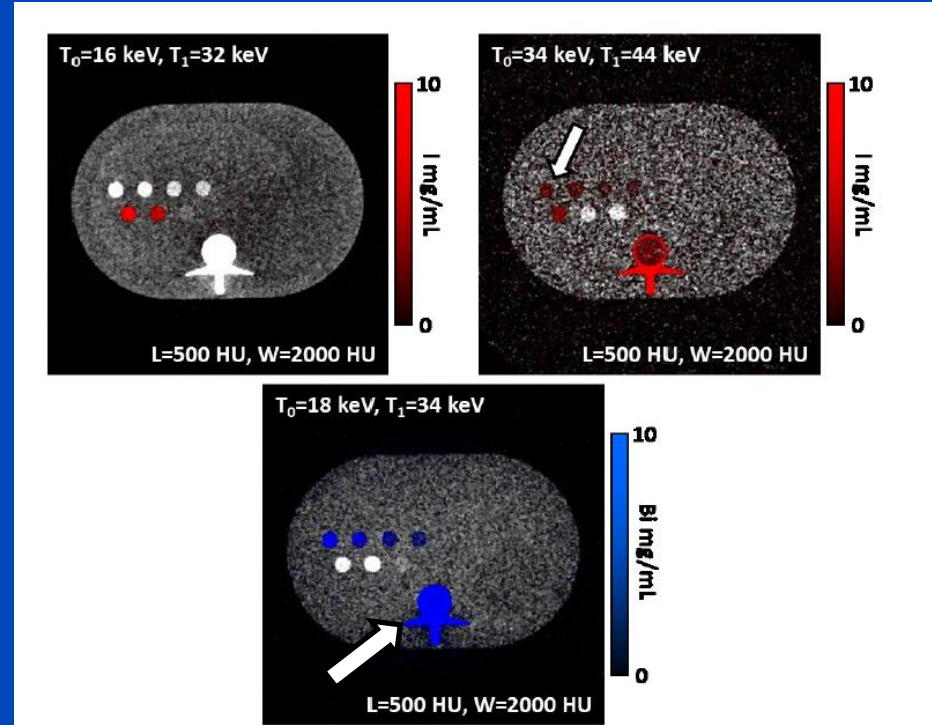
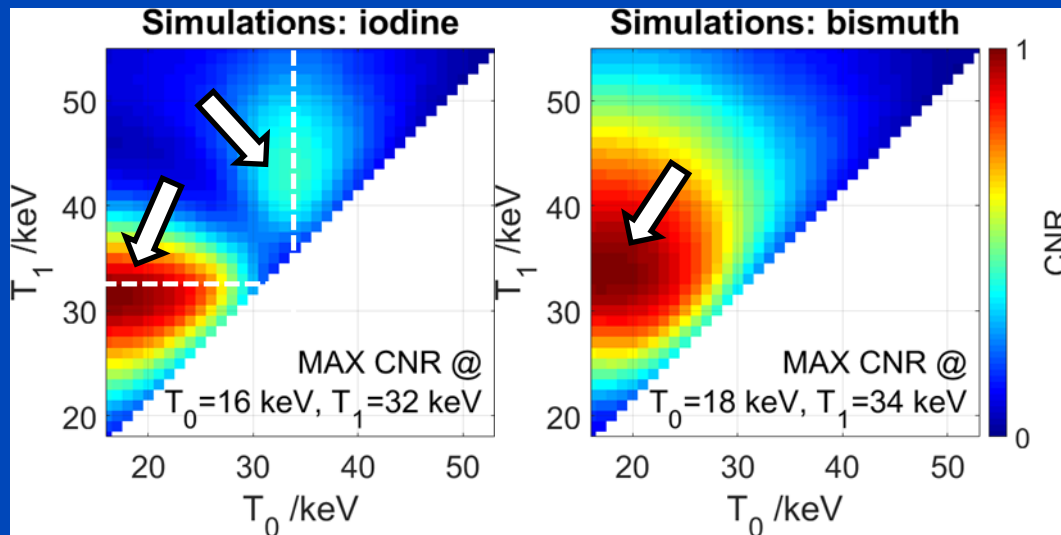
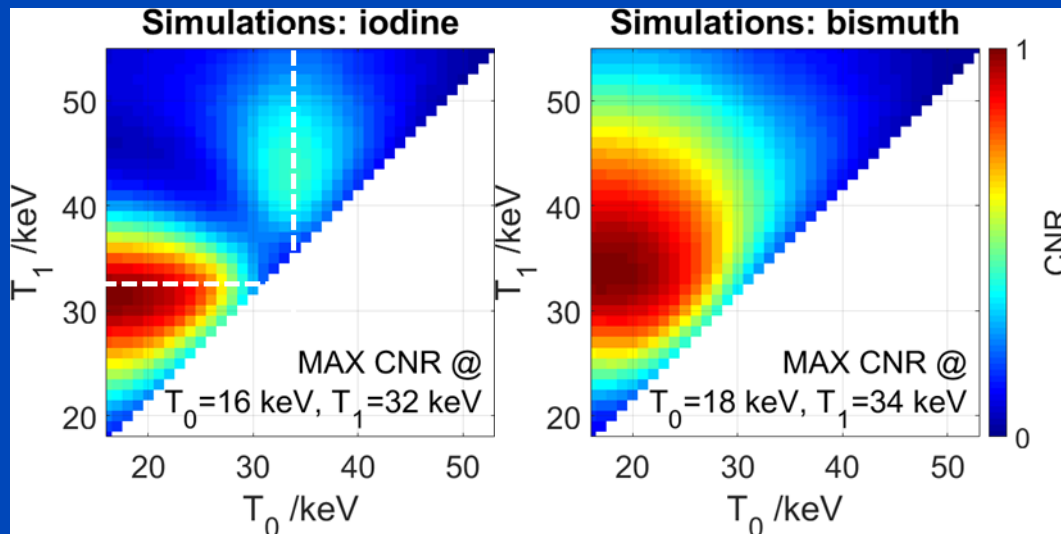


Fig. 5. Material decomposition of iodine with $T_0=16$ keV, $T_1=32$ keV (top-left), iodine with $T_0=34$ keV, $T_1=44$ keV (top-right) and bismuth with $T_0=18$ keV, $T_1=34$ keV (bottom). In the top-right image, it can be seen how bismuth is partially decomposed as iodine (white arrow) for the specific threshold choice.

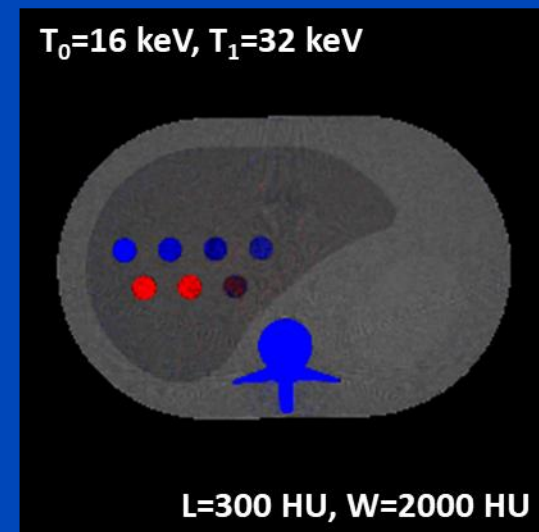
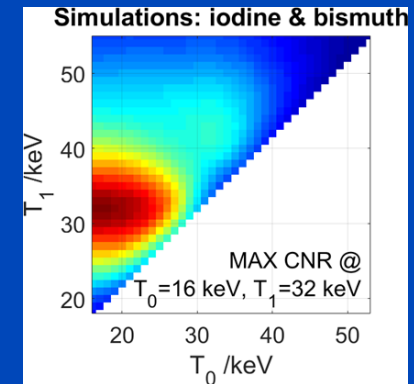
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CNR as a function of the two energy thresholds.
Simulations:



Overlap of the peaks

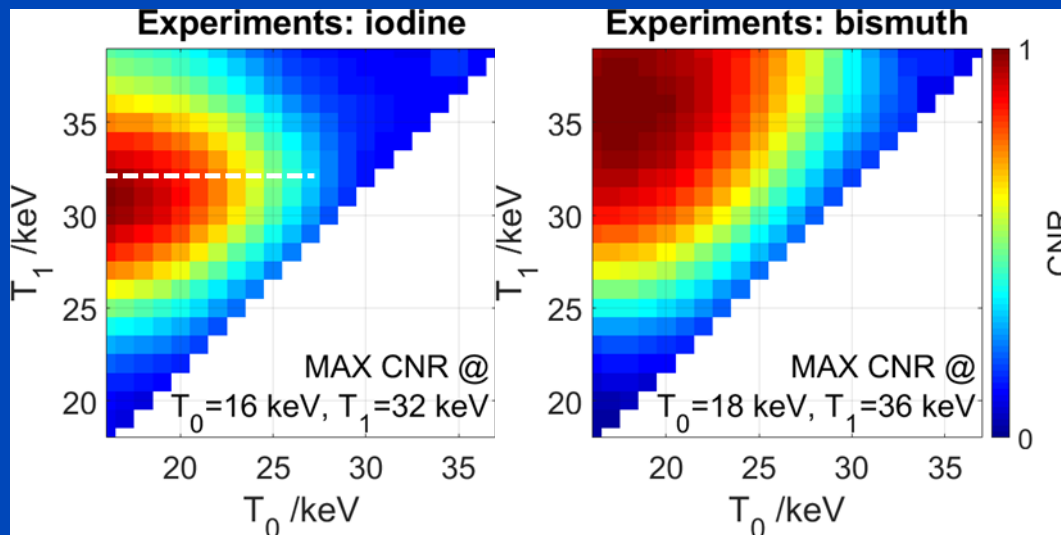


3 material decomposition

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CNR as a function of the two energy thresholds.
Measurements:



Overlap of the peaks

