



# Material Decomposition in X-ray Phase-Contrast Imaging with Coherent Sources

## Fact Sheet

### Project Information

#### DEPICT

Grant agreement ID: 101125761

#### DOI

[10.3030/101125761](https://doi.org/10.3030/101125761)

#### EC signature date

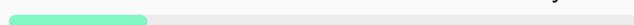
13 December 2023

#### Start date

1 March 2024

#### End date

28 February 2029



#### Funded under

European Research Council (ERC)

#### Total cost

€ 2 620 750,00

#### EU contribution

€ 2 620 750,00

#### Investment in EU policy priorities

Digital agenda	<input checked="" type="radio"/>	Clean air	<input type="radio"/>
Artificial Intelligence	<input type="radio"/>	Climate action	<input type="radio"/>
Biodiversity	<input type="radio"/>		

#### Coordinated by

TECHNISCHE UNIVERSITAET  
MUENCHEN

 Germany

## Objective

X-ray microtomography is increasingly popular at synchrotron sources worldwide. The high flux and excellent beam properties allow for a fast three-dimensional visualization of various kinds of specimens at micrometre spatial resolution and

exceptionally high image quality. But all these imaging instruments use the unique synchrotron sources merely to depict the objects' internal structure. All further quantitative information encoded into the data remains unused. The reason is a lack of an image retrieval method, which accurately models the whole image formation process with highly-coherent radiation on the micrometre scale to extract all contained information from a single exposure. Consequently, these microtomographic images always contain a mixture of different signals based on various interaction effects – namely attenuation, refraction and scattering. Accurately separating all the signals will allow to quantify concentration and microstructure of materials of interest and to locate them inside the object, which is unattainable in a single exposure at the moment.

The main goal of this project is to enable simple and fast X-ray microtomography at highly-coherent sources to fully exploit the disregarded information contained in the imaging data. My team will develop a robust algorithm for accurate signal separation modelling all interaction effects and demonstrate the benefit of material decomposition for highlighted applications. With this tool at hand our ambition is to fundamentally change the way of imaging at modern synchrotron sources: Imaging will no longer be solely a morphological method, as quantitative and material-specific information will become standardly available in fast microtomography at all coherent sources worldwide.

## Keywords

[quantitative imaging](#)

[material decomposition](#)

[coherent sources](#)

[phase retrieval](#)

## Programme(s)

[HORIZON.1.1 - European Research Council \(ERC\)](#)

MAIN PROGRAMME

## Topic(s)

[ERC-2023-COG - ERC CONSOLIDATOR GRANTS](#)

## Call for proposal

[ERC-2023-COG](#)

[See other projects for this call](#)

# Funding Scheme

[HORIZON-ERC - HORIZON ERC Grants](#)

## Host institution



### TECHNISCHE UNIVERSITAET MUENCHEN

Net EU contribution

€ 2 620 750,00

Total cost

€ 2 620 750,00

Address

Arcisstrasse 21  
80333 Muenchen

 Germany 

Region

Bayern > Oberbayern > München, Kreisfreie Stadt

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

## Beneficiaries (1)



### TECHNISCHE UNIVERSITAET MUENCHEN

 Germany

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Total cost

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**Last update:** 26 December 2023

**Permalink:** <https://cordis.europa.eu/project/id/101125761>

European Union, 2025