

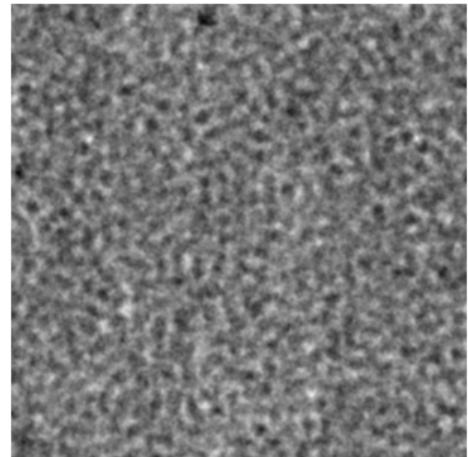
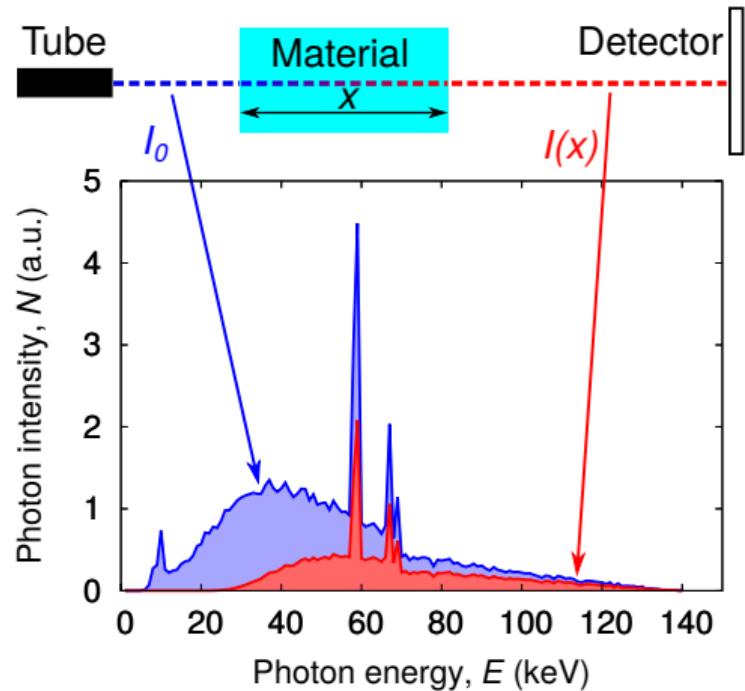


PhD defense **Manuel Baur**

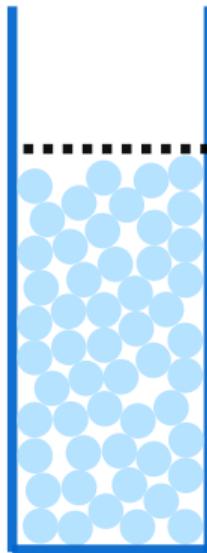
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Federal Ministry for
Economic Affairs and
Energy, grant no. 50WM

1653

X-ray radiography of granular systems – particle densities and dynamics

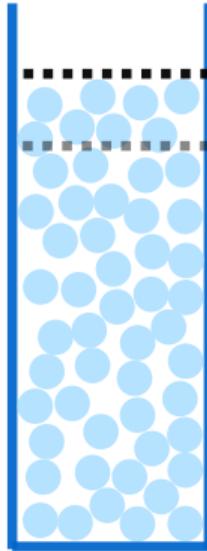


X-ray radiography of granular systems – particle densities and dynamics



$$\Phi = \text{RLP}$$

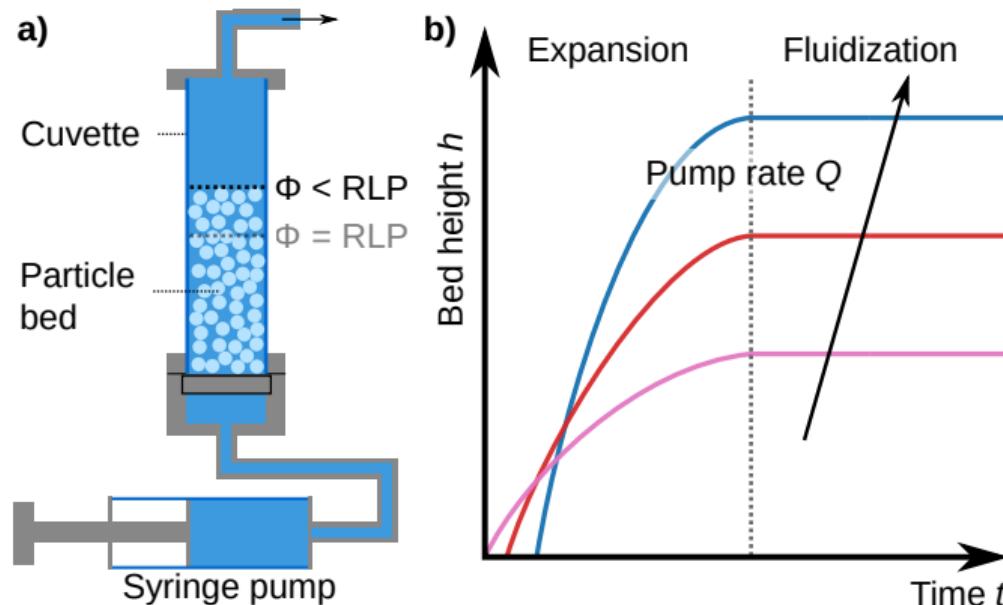
X-ray radiography of granular systems – particle densities and dynamics



$\Phi < \text{RLP}$
 $\Phi = \text{RLP}$

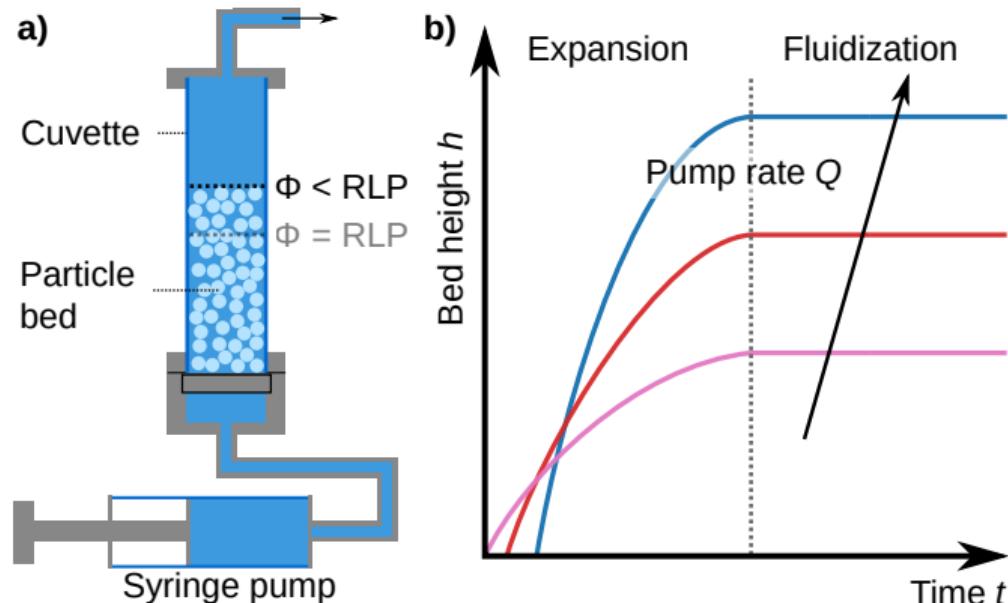
X-ray radiography of granular systems – particle densities and dynamics

Fluidized bed



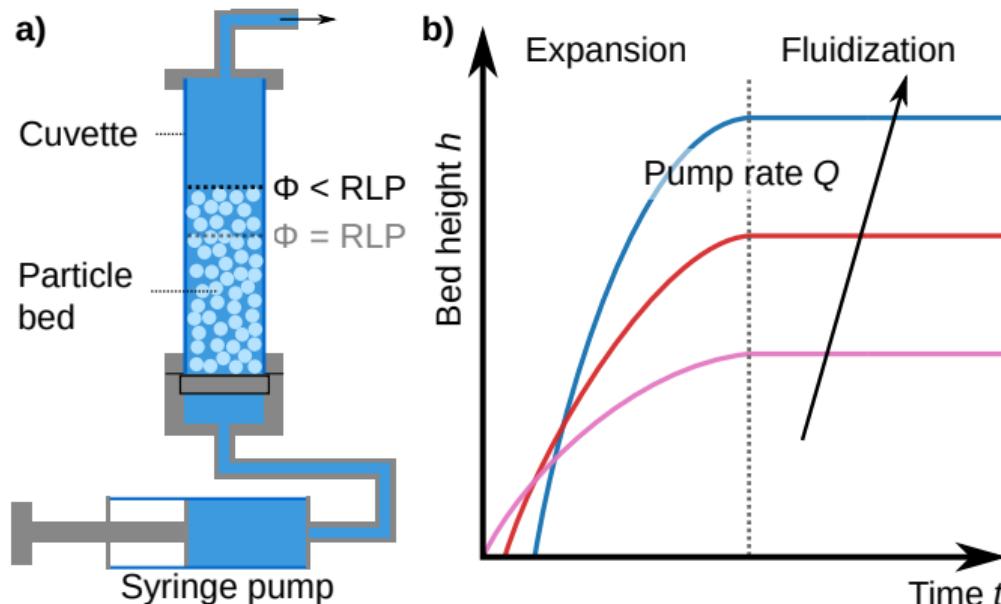
X-ray radiography of granular systems – particle densities and dynamics

Fluidized bed



X-ray radiography of granular systems – particle densities and dynamics

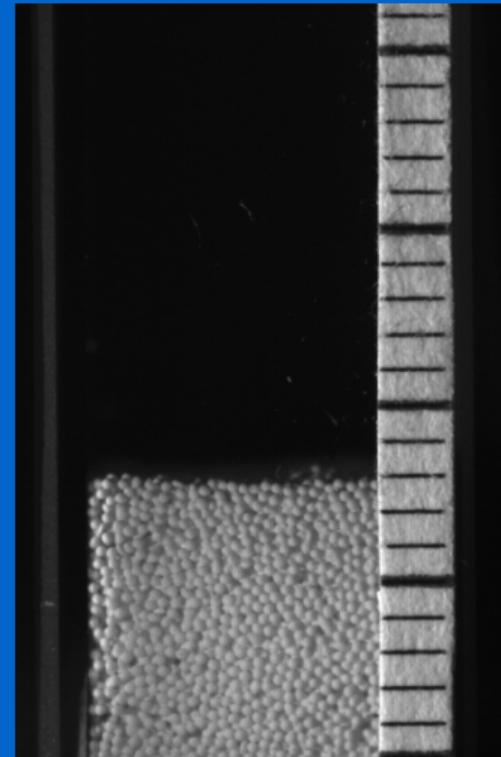
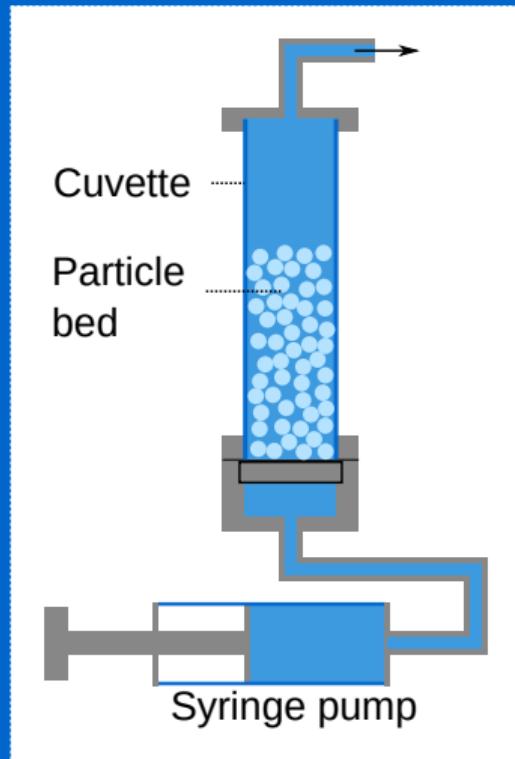
Fluidized bed



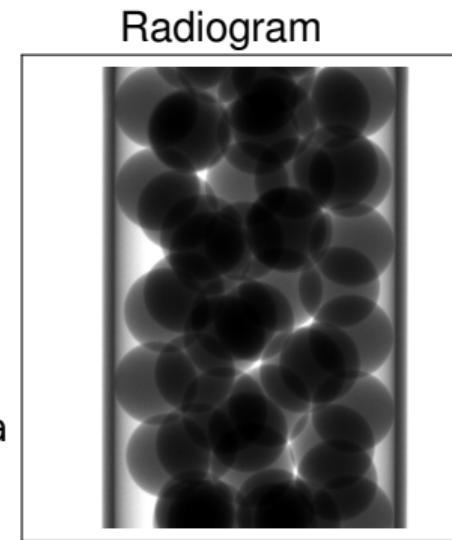
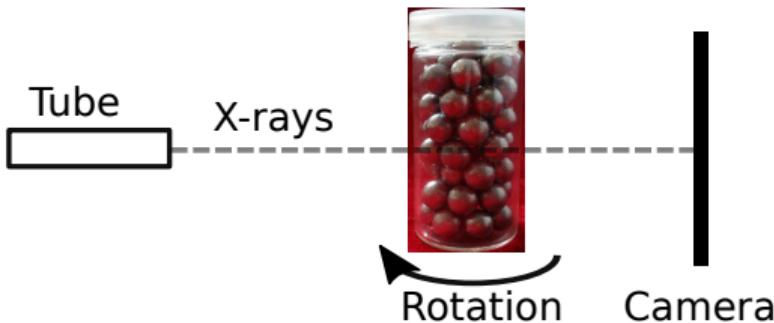
Fluidized bed reactor

"Lack of understanding:
It is very difficult to predict and calculate the **complex mass** [...] **flows** within the bed."

Particulate flows are **opaque**

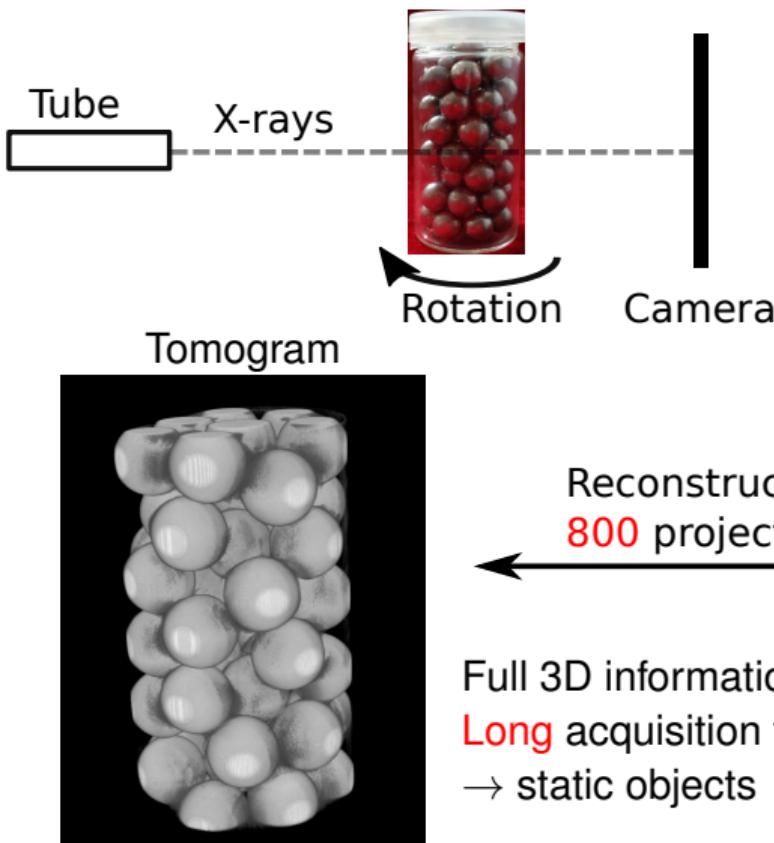


X-ray radiography

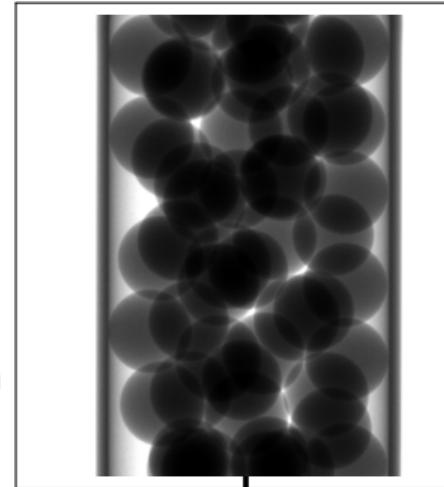


2D projections of 3D object
Short acquisition time

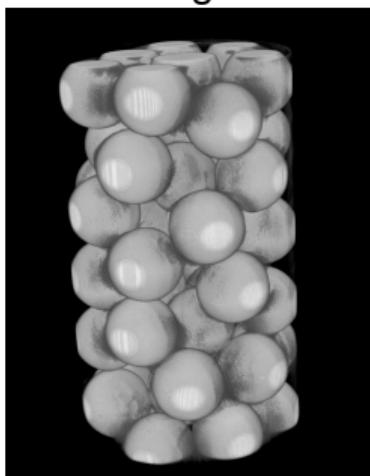
X-ray radiography



Radiogram



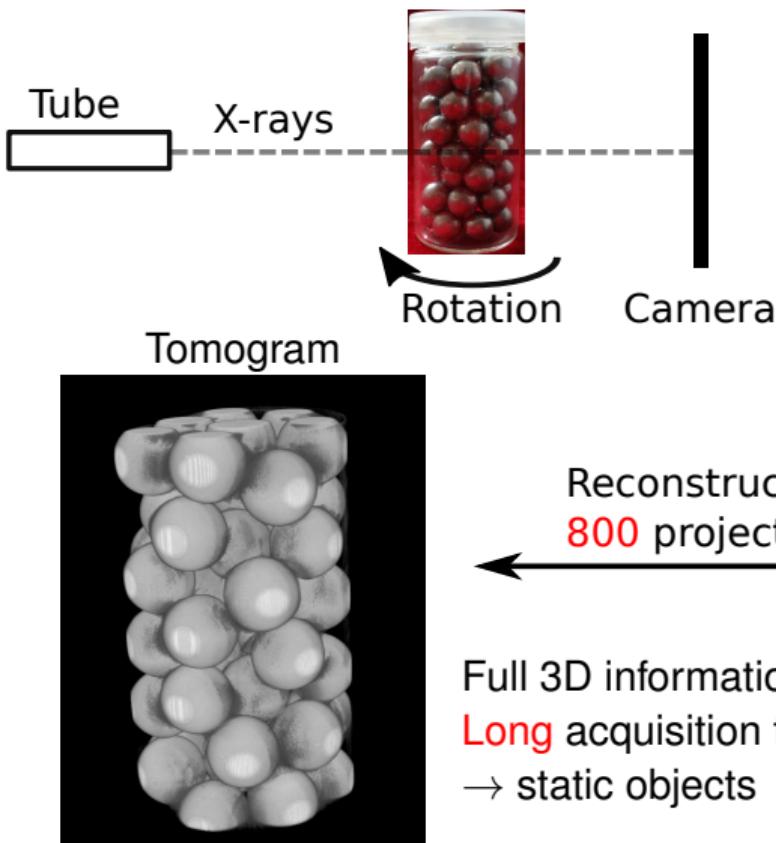
2D projections of 3D object
Short acquisition time



Reconstruction from
800 projections

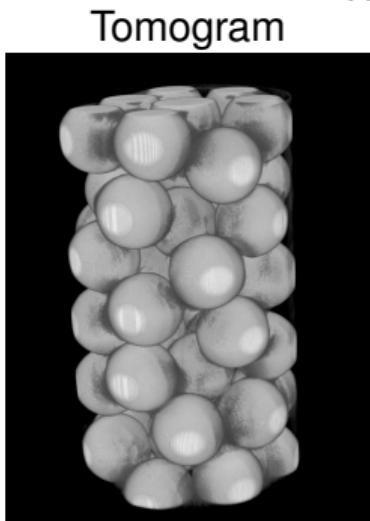
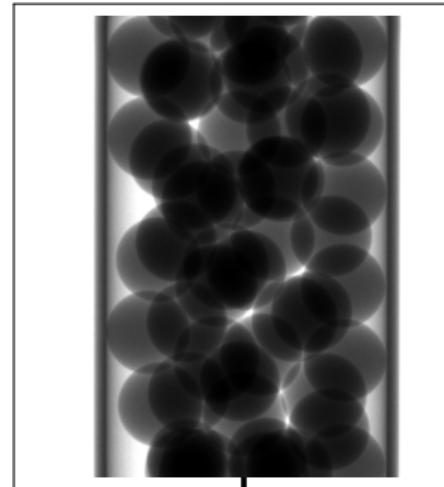
Full 3D information
Long acquisition time
→ static objects

X-ray radiography



Radiogram

2D projections of 3D object
Short acquisition time



Full 3D information
Long acquisition time
→ static objects

Dynamic system

