Hydromechanics of porous media through advanced simultaneous x-ray and neutron imaging

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- Combining experimental and numerical tests to **improve** our understanding of **multi-phase fluid flow in porous media**

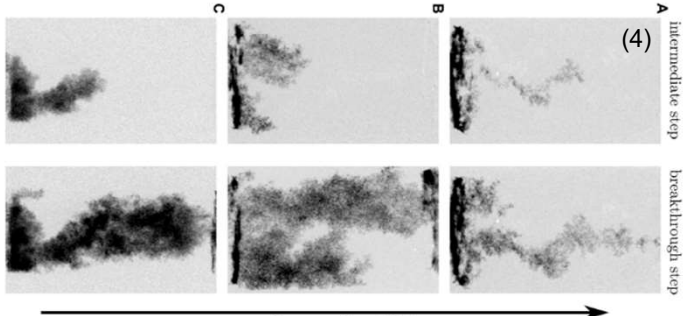
- Our study will rely on **NeXT**(5), a unique instrument capable of acquiring x-ray and neutron tomographies simultaneously.

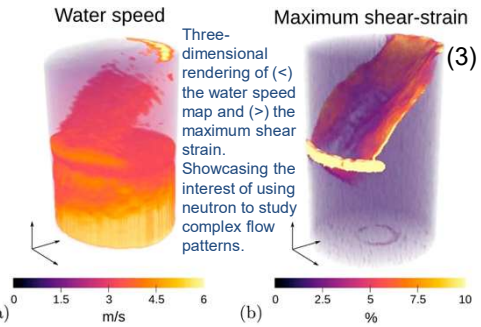
- We'll develop new **numerical tools**, applying imaging with **P-DVC**(2),(3) and **Super-resolution**(6) (combining neutrons and x-ray tomographies) to address spatial and temporal resolution challenges

P-DVC: *the P-DVC method modifies a reference 3D volume so that its projections match with radiographs of the deformed volume.*

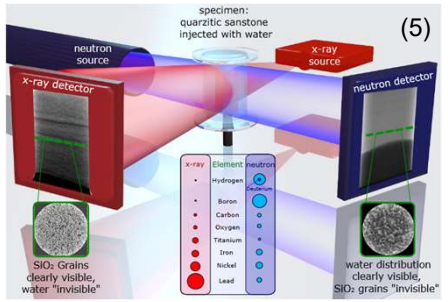
Super-resolution: NeXT can perform simultaneous x-ray and neutron imaging. Through accurate registration of images acquired in both modes, it enables us to enhance neutron spatial resolution.

Different fingering patterns observed in Fontainebleau Sandstone for different injection





Three-dimensional rendering of (<) the water speed map and (>) the maximum shear strain. Showcasing the interest of using neutron to study complex flow patterns.



(1) Financement ministériel
(2) Jailin *et al*, 2018
(3) Tudisco *et al*, 2019
(4) Couture *et al*, 2022
(5) Tengattini *et al*, 2020
(6) Park *et al*, 2003

GéoMécanique