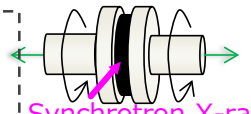
Exploring the frontiers of the 4D world

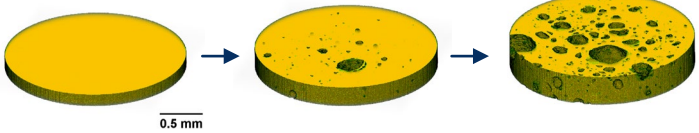
We live in a **"4D world"**, but in the 4D space-time region of less than μm and ms, there is a vast unknown world that is inaccessible even to the most advanced measurement technologies.

In our laboratory, we are taking on the challenge of developing new imaging techniques that dramatically exceed the conventional limits by exploiting **high-energy quantum beams such as X-rays, advanced micro/nanofabrication technologies, and data science techniques**, and to open up the uncharted 4D world. Our imaging technologies will not only lead to a new understanding of various irreversible and non-equilibrium systems in the material and life sciences, but will also have diverse ripple effects on general society.

Real-Time 4D X-ray CT of Tensile Fracture of Tire Rubber

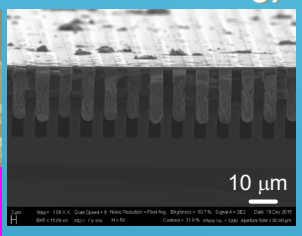
Temporal Res. : 10 ms
Spatial Res. : 5 μm
Tensile speed : 1.2 mm/s



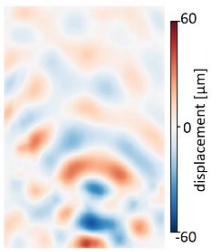


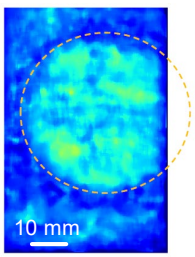
Optical Elements for X-rays and Neutrons Fabricated by Microfabrication Technology

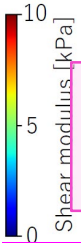
JST CREST
(2017.10～2023.3)



Visualization of "Hardness" Distribution in Soft Materials (X-ray Elastography)







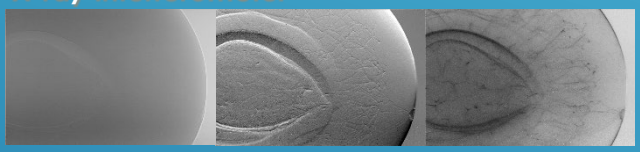
Applicable to new medical diagnosis method

Propagation of shear waves*1 Distribution of shear modulus

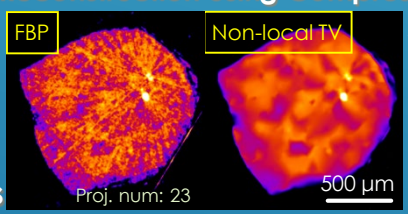
*1Non-rigid registration

AMED SENTAN
(2017.8～2020.3)

Projected Images of a Cherry Taken with a State-of-the-Art High-Sensitivity X-ray Interferometer



CT Reconstruction using Compressed Sensing*2



*2Joint research with Professor Hiroyuki Kudo (University of Tsukuba)

Sample : PS/PMMA polymer blend

Synchrotron Facilities

Next Generation Synchrotron Radiation Facility @Aobayama campus

SPring-8 @Hyogo

YASHIRO LAB*3

Prof. Yashiro

Access :
Katahira Campus B06 S224 (2F)
E-mail: wyashiro@tohoku.ac.jp

Yashiro Laboratory Website (with movies)

*3Yashiro Laboratory is a new laboratory that was established in April 2021.