Dodynet Mid-Term Review
ESR 13

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In collaboration with Luca Cipelletti (Montpellier, CNRS)

ESPCI PARIS | PSL

DODynet INITIAL TRAINING NETWORK

UNIVERSITE MONTPELLIER

Biography and previous research

2014, Bachelor of Engineering

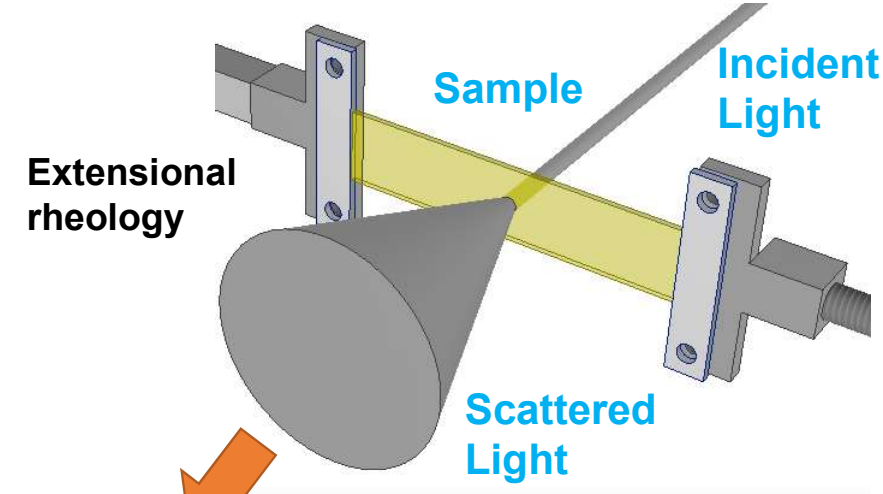
Mechanical Engineering and Instrumentation

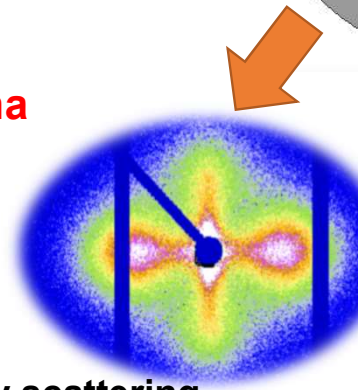
Dalian University of Technology, Dalian, China

2017, Master of Engineering

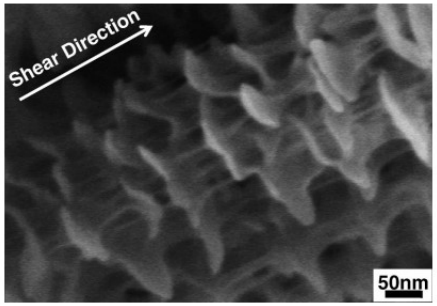
Polymer physics and Synchrotron Radiation Technology

University of Science and Technology of China, Hefei, China



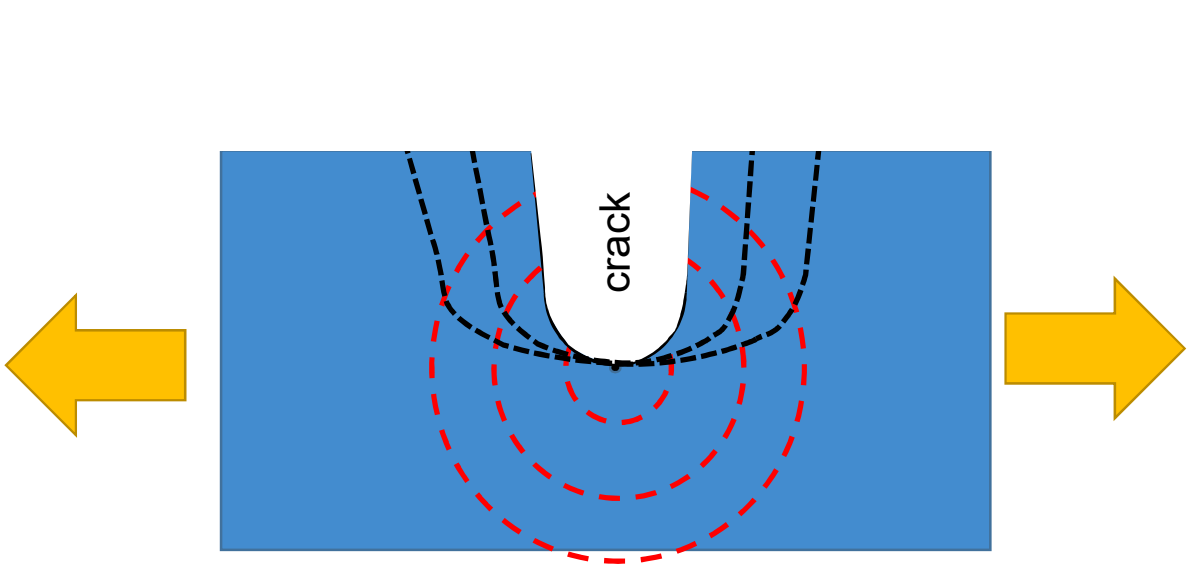


X-ray scattering

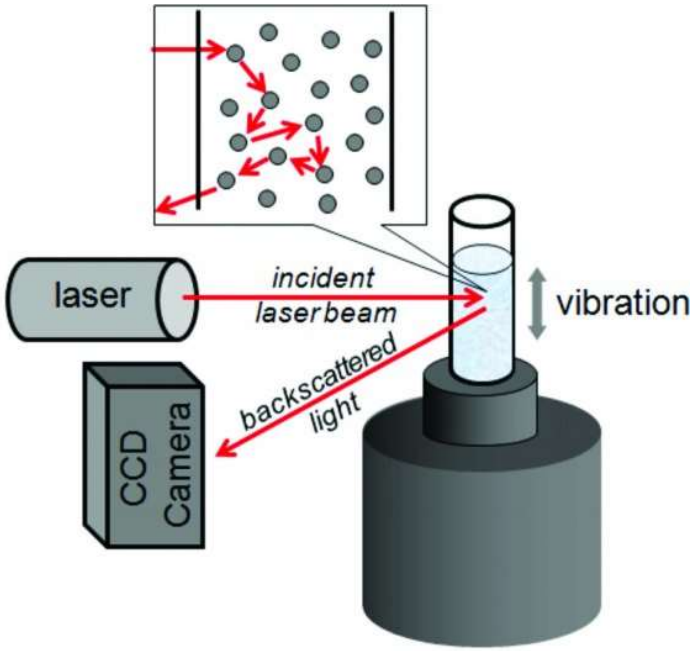


Flow induced crystallization

Topic: Diffusing Wave Spectroscopy on elastomer fracture



Dynamics Increase

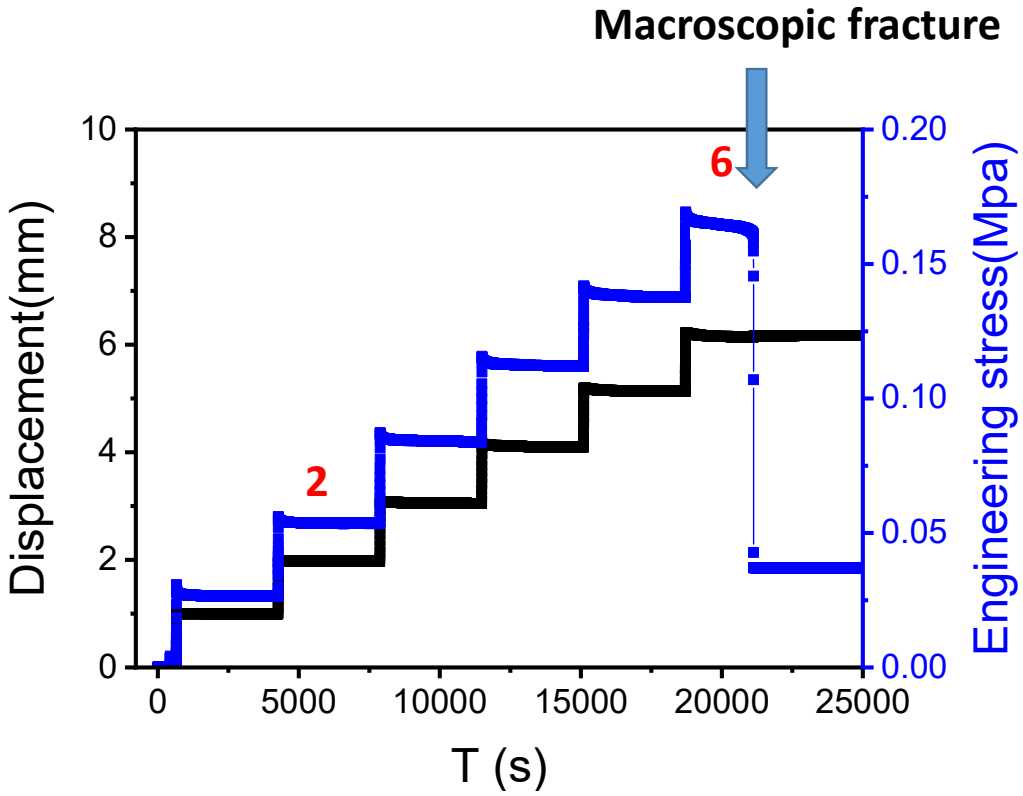


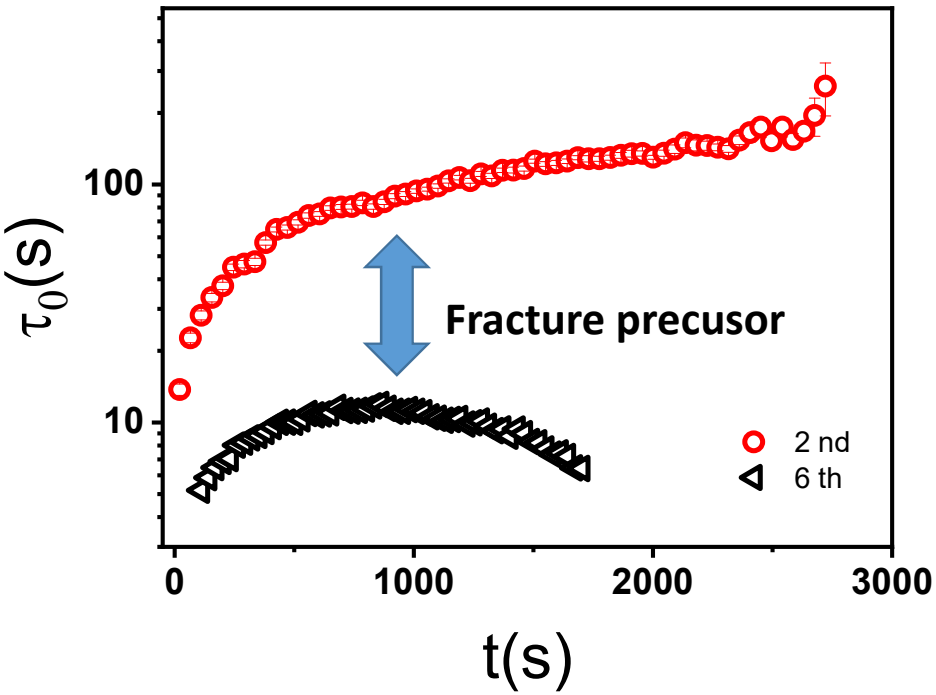
DWS: Multiple scattering

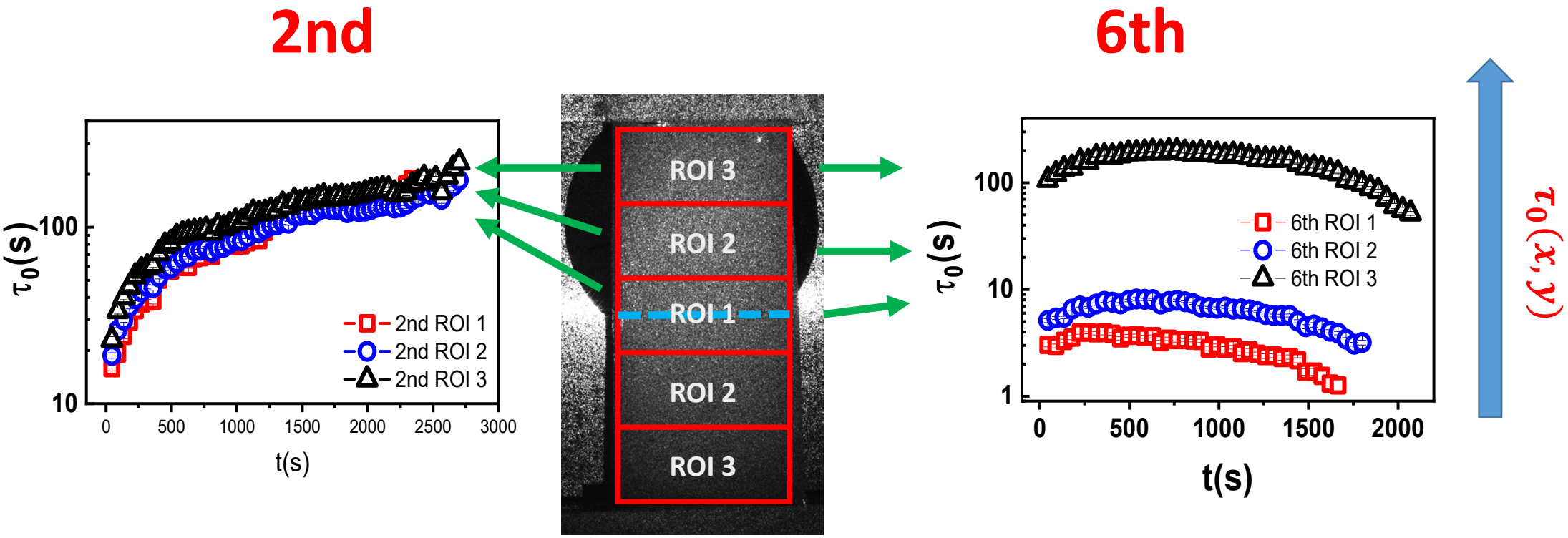
Fracture precursor

$$g_2(\tau)-1 = \frac{\langle I_P(t) I_P(t+\tau)\rangle_P}{\langle I_P(t)\rangle_P \langle I_P(t+\tau)\rangle_P} - 1$$

$$= Aexp\left(-\left(\frac{\tau}{\tau_0}\right)^P\right) + B$$






2nd
6th
τ_0(s)
100
10
0
500
1000
1500
2000
2500
3000
t(s)
2nd ROI 1
2nd ROI 2
2nd ROI 3
ROI 3
ROI 2
ROI 1
ROI 2
ROI 3
τ_0(s)
100
10
1
0
500
1000
1500
2000
t(s)
6th ROI 1
6th ROI 2
6th ROI 3
$\tau_0(x, y)$

Application of DWS technology on polymer network

- **1. Sample preparation**

  Introduction probe particles during crosslinking

  - **1. PDMS (model sample)**
  - **2. Multiple networks from acrylates (from Labortory)** ← **We are here**
  - **3. Double Dynamic networks (from other Dodynet partners)**

- **2. Set-up development**

  - **1. optical part (DWS testing system)**
  - **2. mechanical part (Tensile machine)**

  } **On the way**

Scientific training

- 1. Chemical training for sample preparation
  - a. Photopolymerization
  - b. Introduction of nanoparticles during crosslinking
- 2. Devices development
  - a. optical part
    - 1. Optical alignment
    - 2. Image acquisition and processing
  - b. mechanical part
    - 1. Tensile stage fabrication
    - 2. Force measurement
    - 3. Motion control
- 3. DWS technology training (Montpellier U, 2018.12)

Outreach activities

- Group meeting presentation (2019.02)
- Dodynet Instagram dissemination materials (2019.04)

Outlook

- Secondment in DSM and Montpellier University
- Collaboration with other scientific institute

Thank you!