

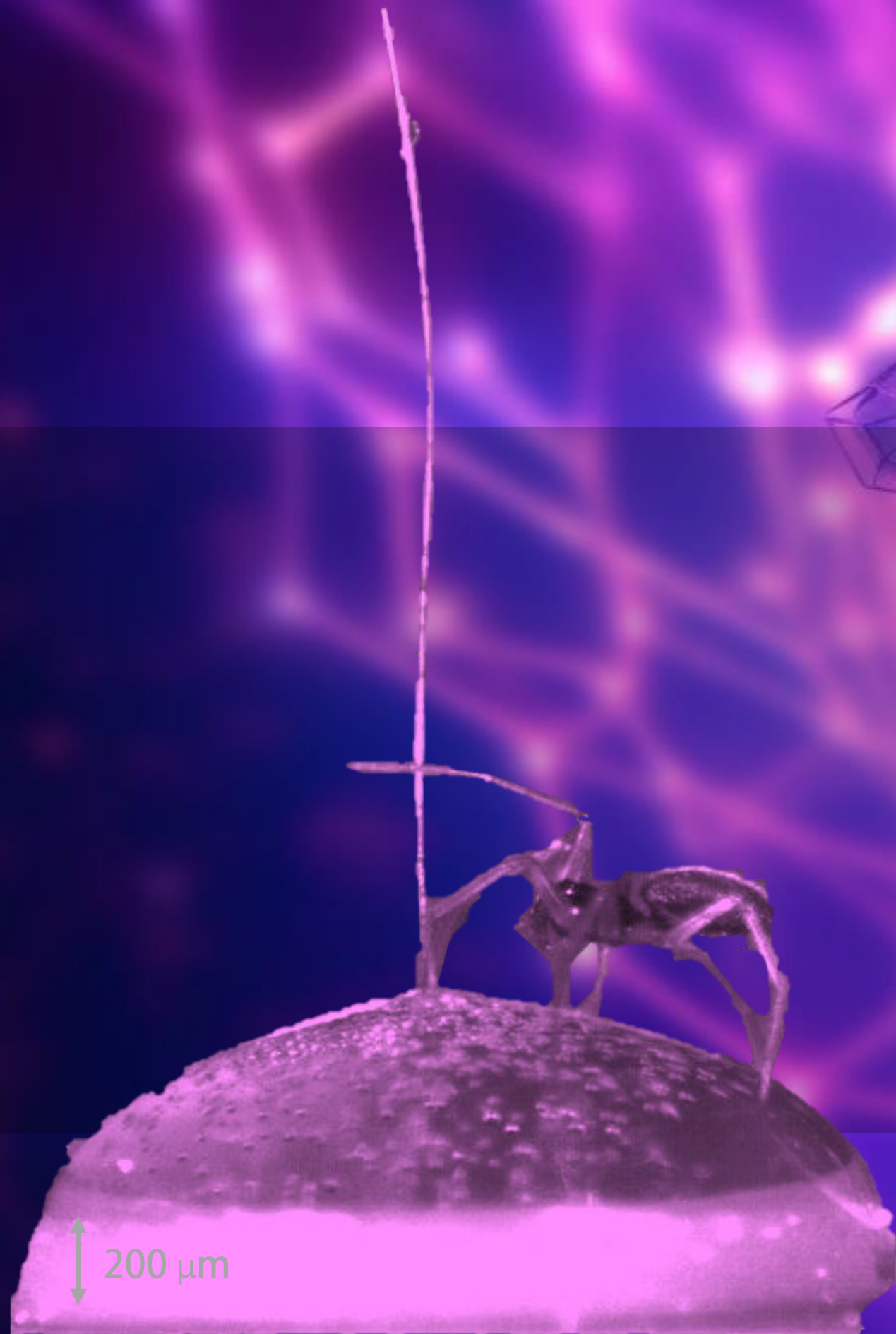
PUZZLE XTM 2023

WEAVING A GREEN FUTURE UNTANGLING PLANT FIBRE DAMPING BEHAVIOUR

FANNY PELISSON

PhD STUDENT AT FEMTO-ST

midifio



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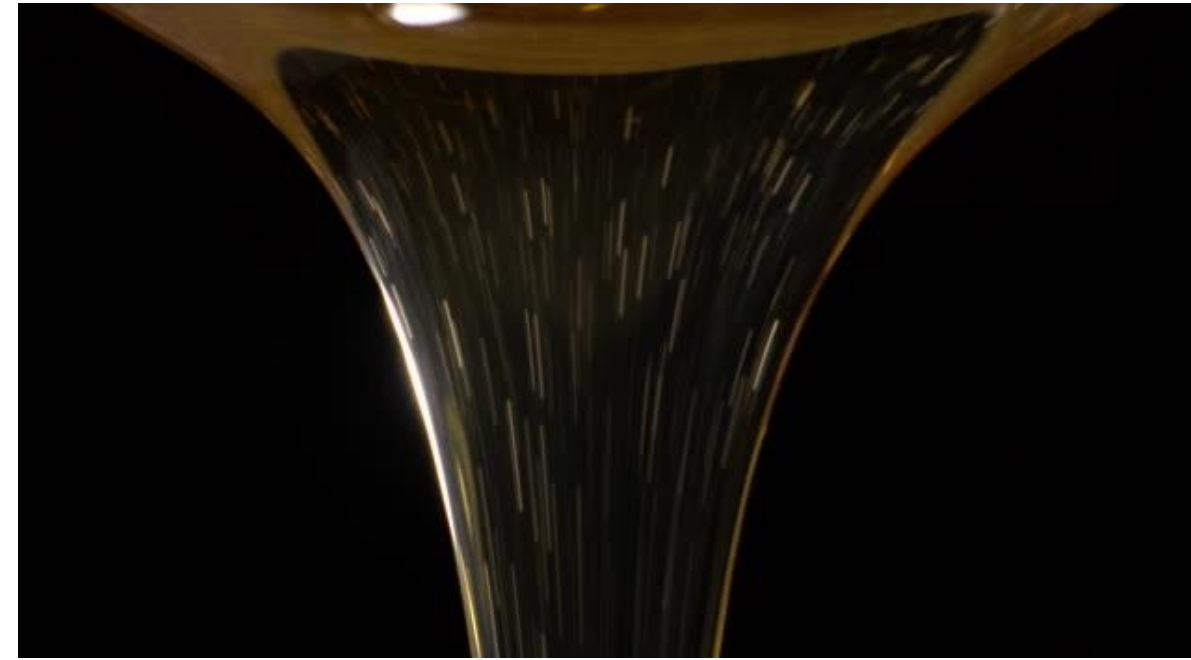
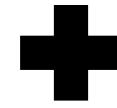
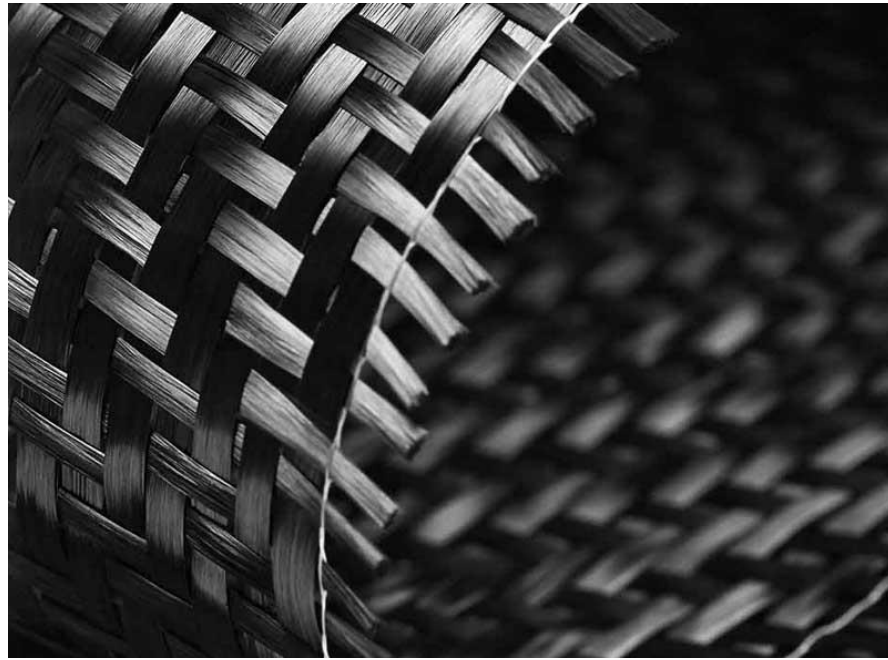


COMPOSITES: GROWING IN EVERY LAYERS

PUZZLE



2023



FIBRES

MATRIX

COMPOSITE

50% COMPOSITE



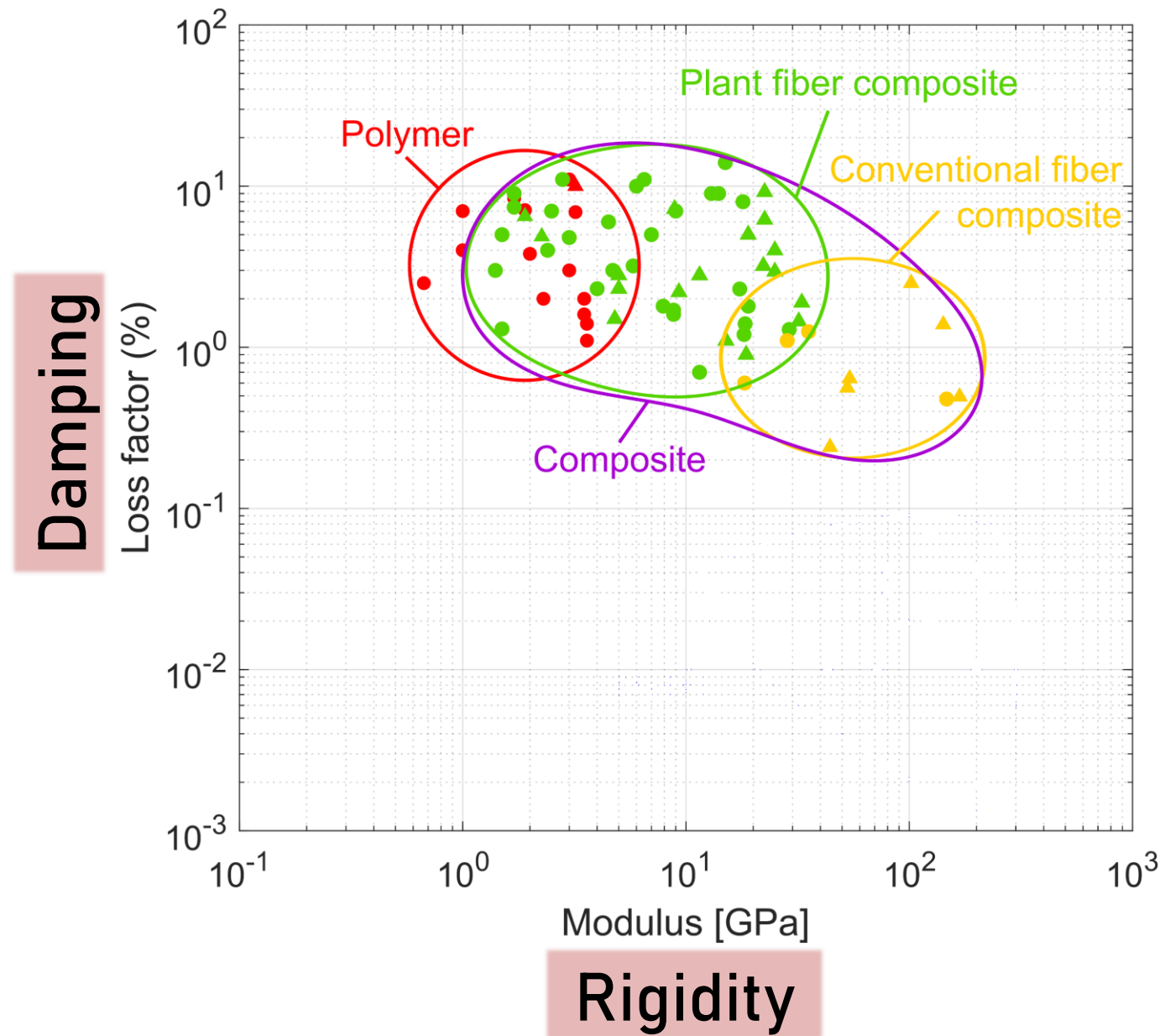
- Carbon laminate
- Carbon sandwich
- Fibreglass
- Aluminium
- Aluminium/steel/titanium pylons

Boeing 787 Dreamliner Composite Components

50 - 70% COMPOSITE



VIBRATION BEHAVIOUR OF COMPOSITES



BIOMASS CONVERSION

CO₂ STORAGE

LIGHTWEIGHT STRUCTURES

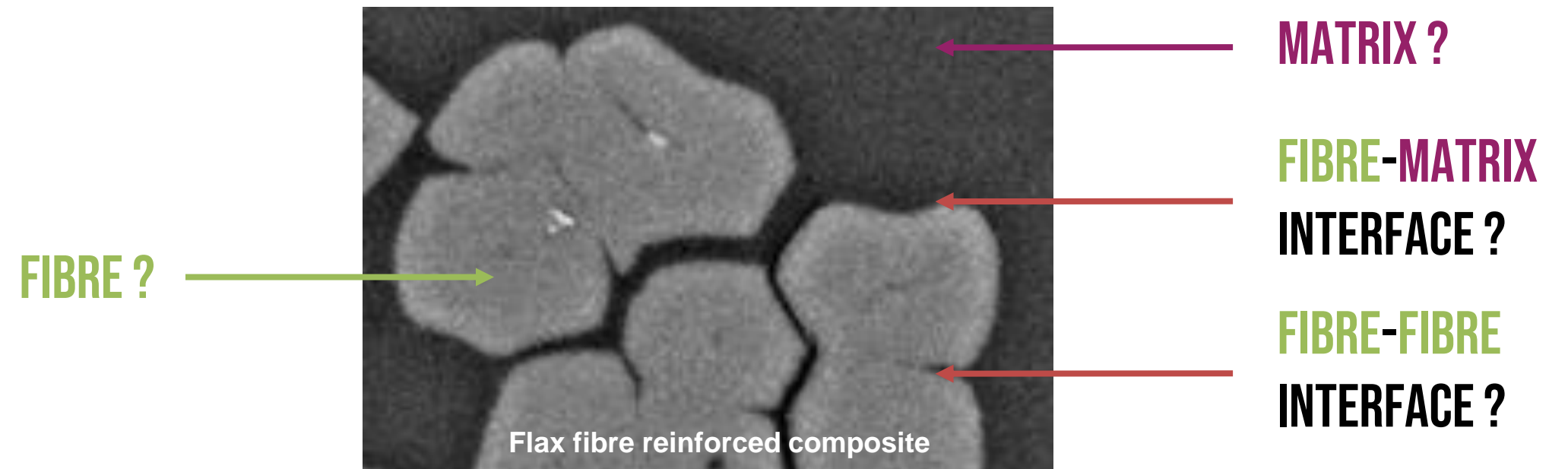
CARBON NEUTRALITY



PLANT-FIBRE REINFORCED COMPOSITES



 **DAMPING SOURCES NOT IDENTIFIED**



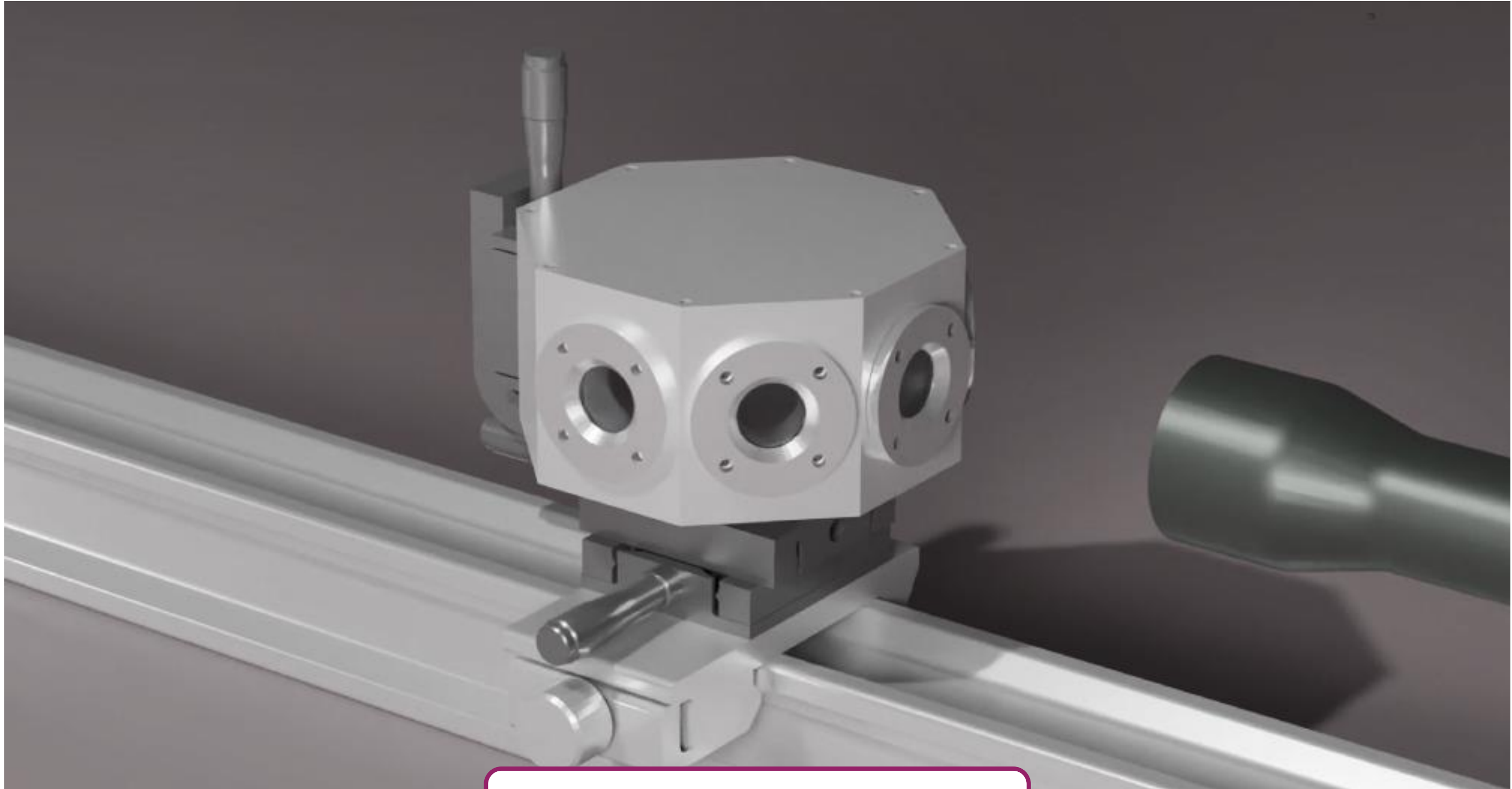
STEP 1

UNDERSTAND DAMPING AT FIBRE SCALE !

UNLOCKING MICROSCALE DAMPING SECRETS

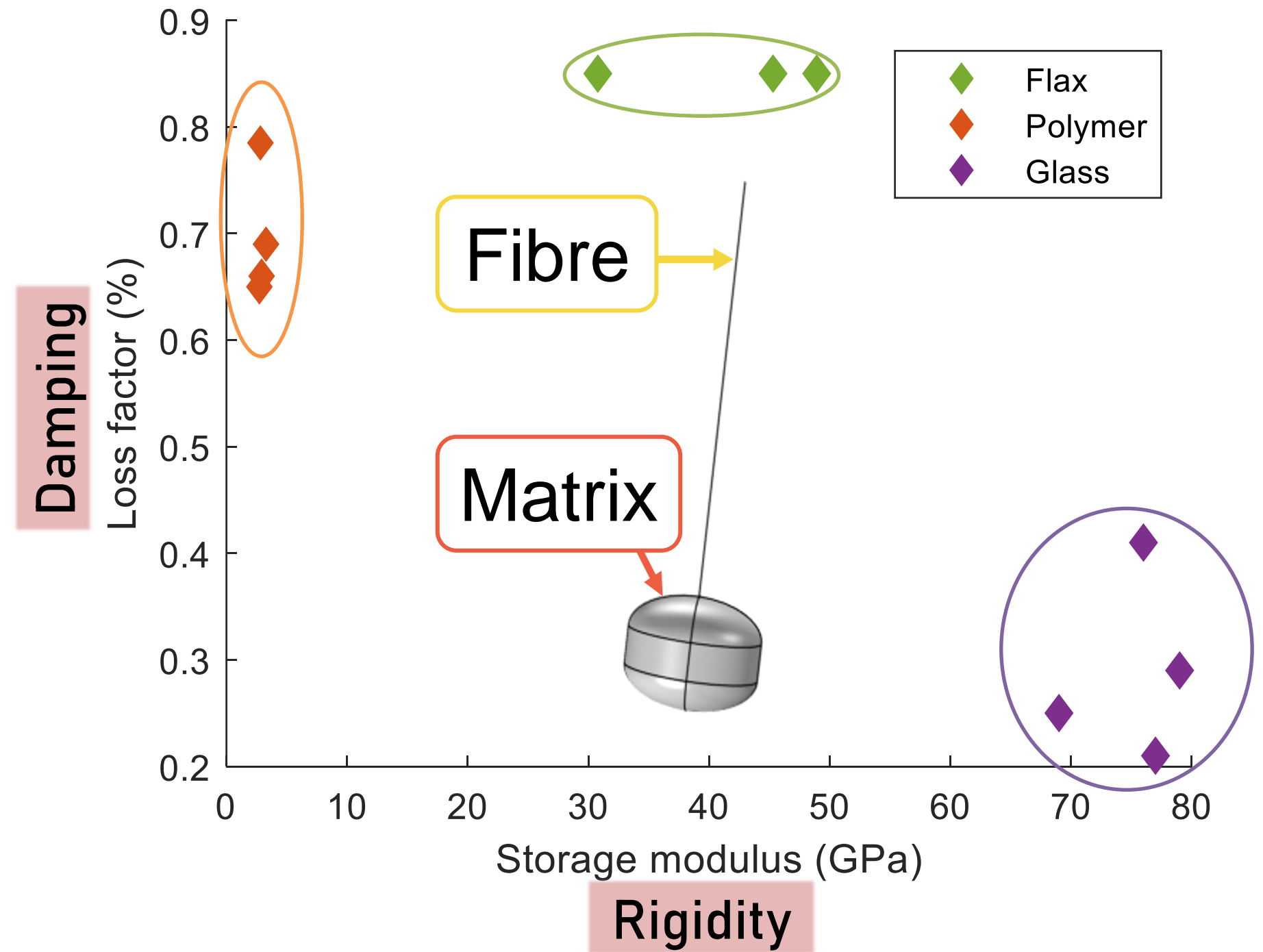
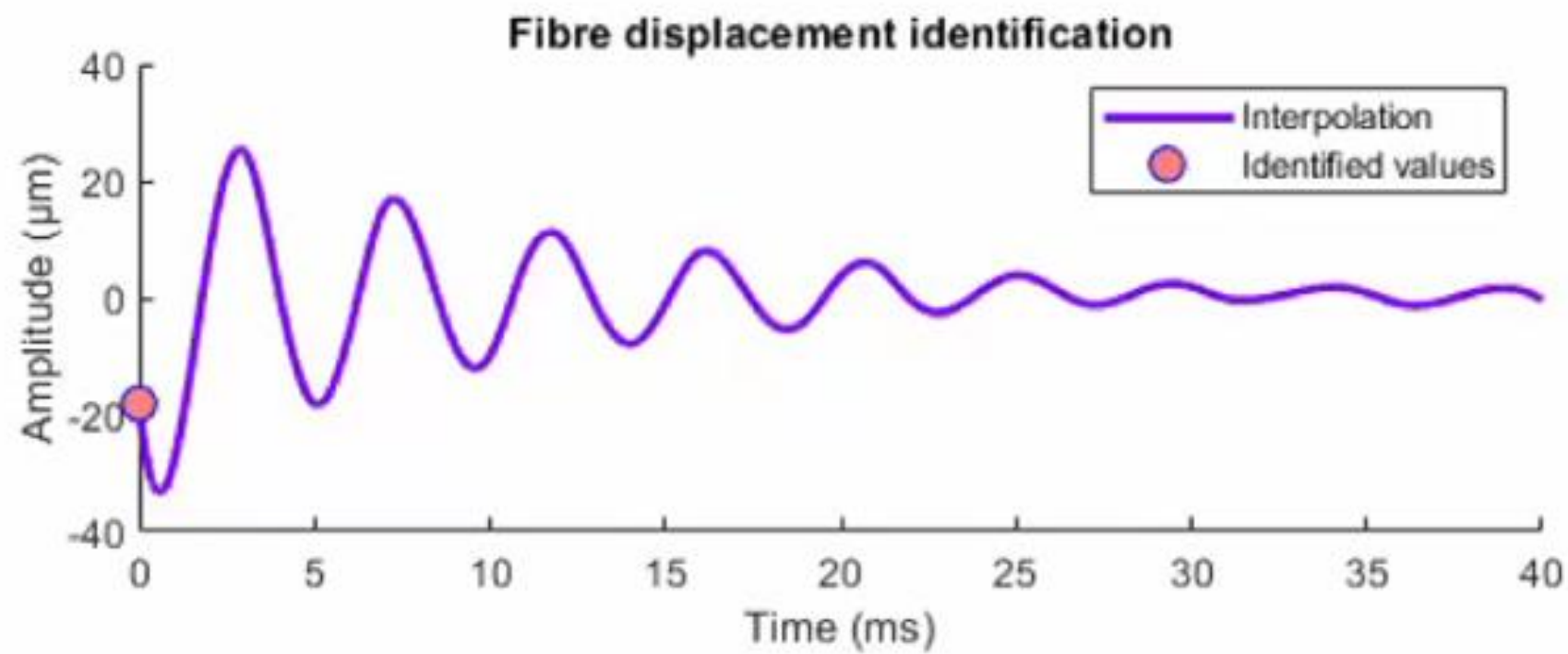
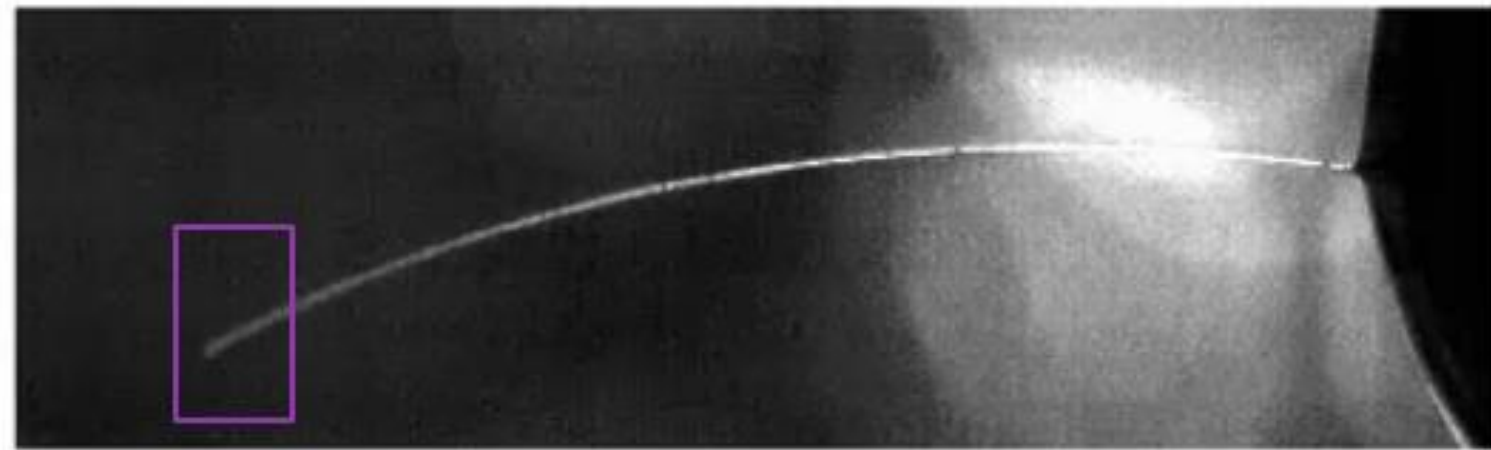
PUZZLE

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2023



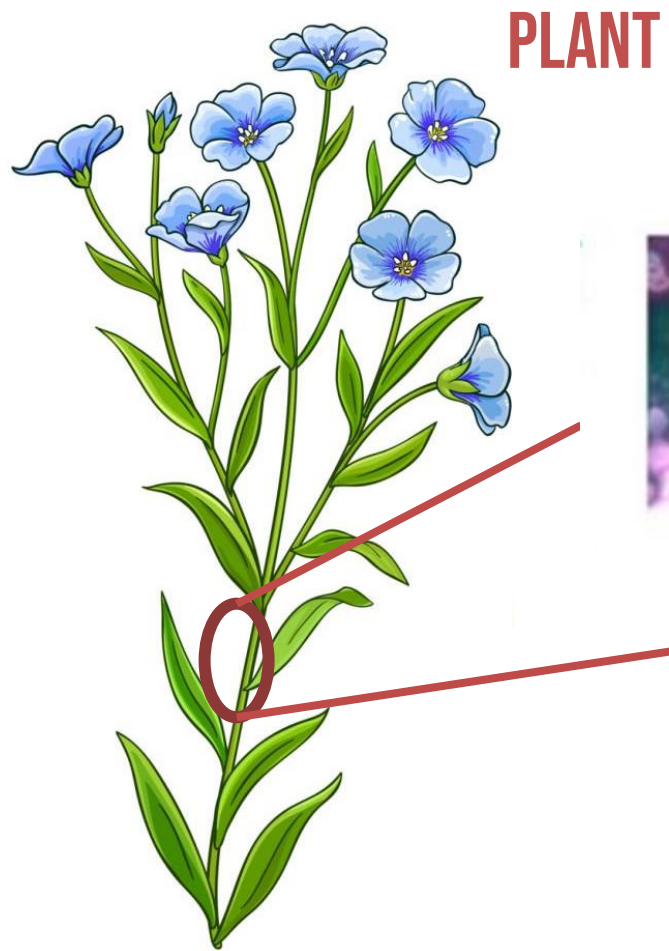
INNOVATIVE VIBRATION EXPERIMENT

UNLOCKING MICROSCALE DAMPING SECRETS

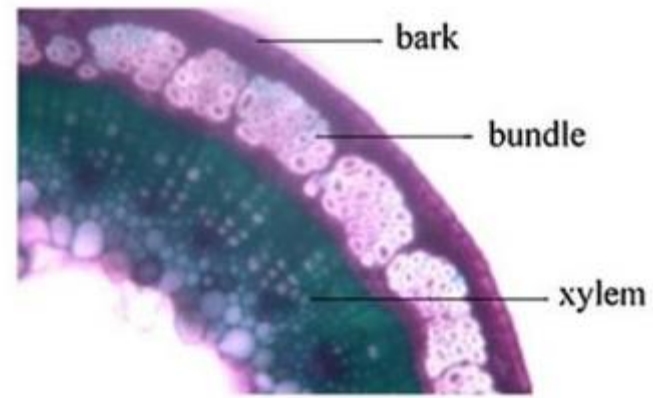


MICRO TO MACRO, TOWARDS A CARBON-FREE FUTURE

PUZZLE X **2023**

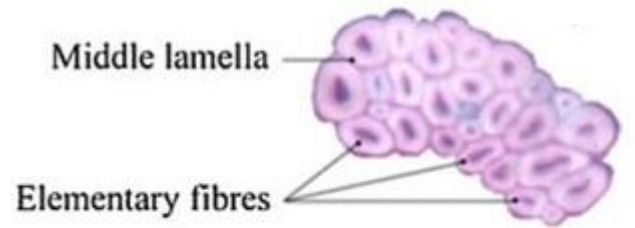


MESO SCALE

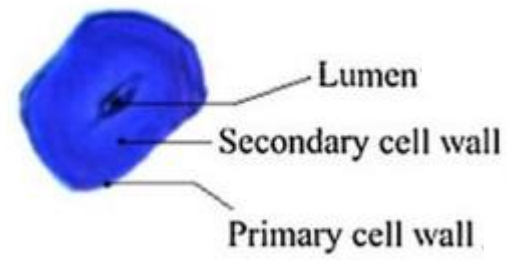


STEM

MICRO SCALE



BUNDLES



ELEMENTARY FIBRES



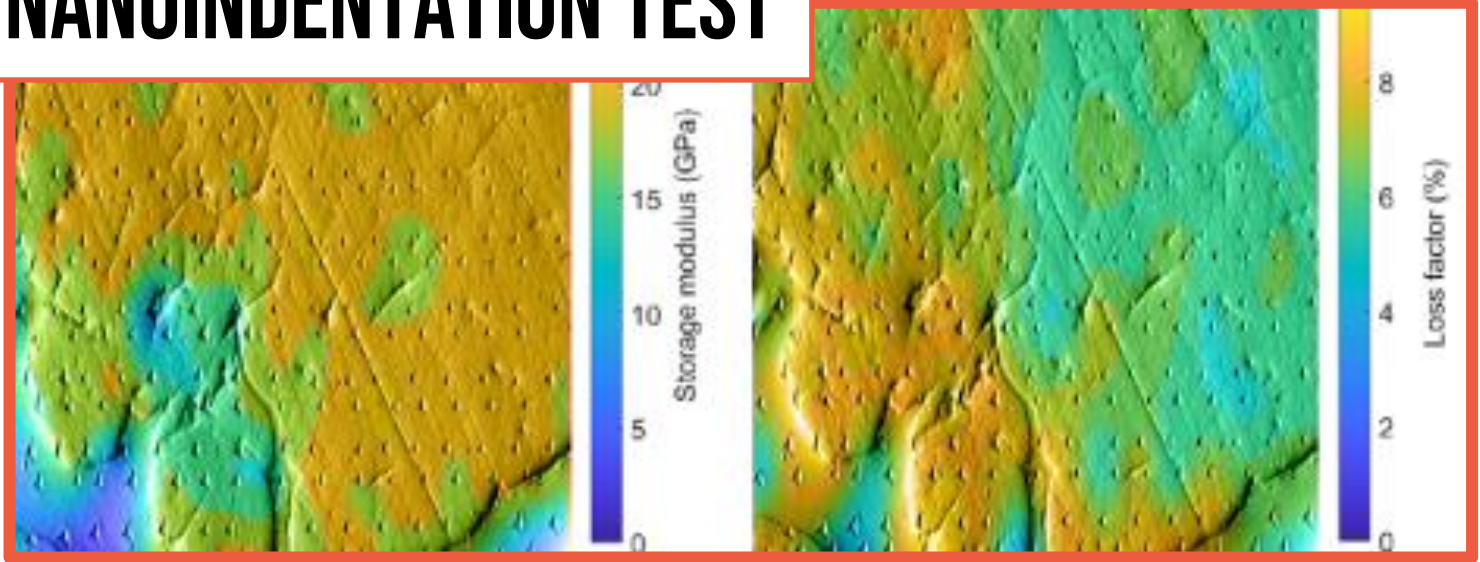
VIBRATION TEST

INTERFACE
FIBRE-MATRIX

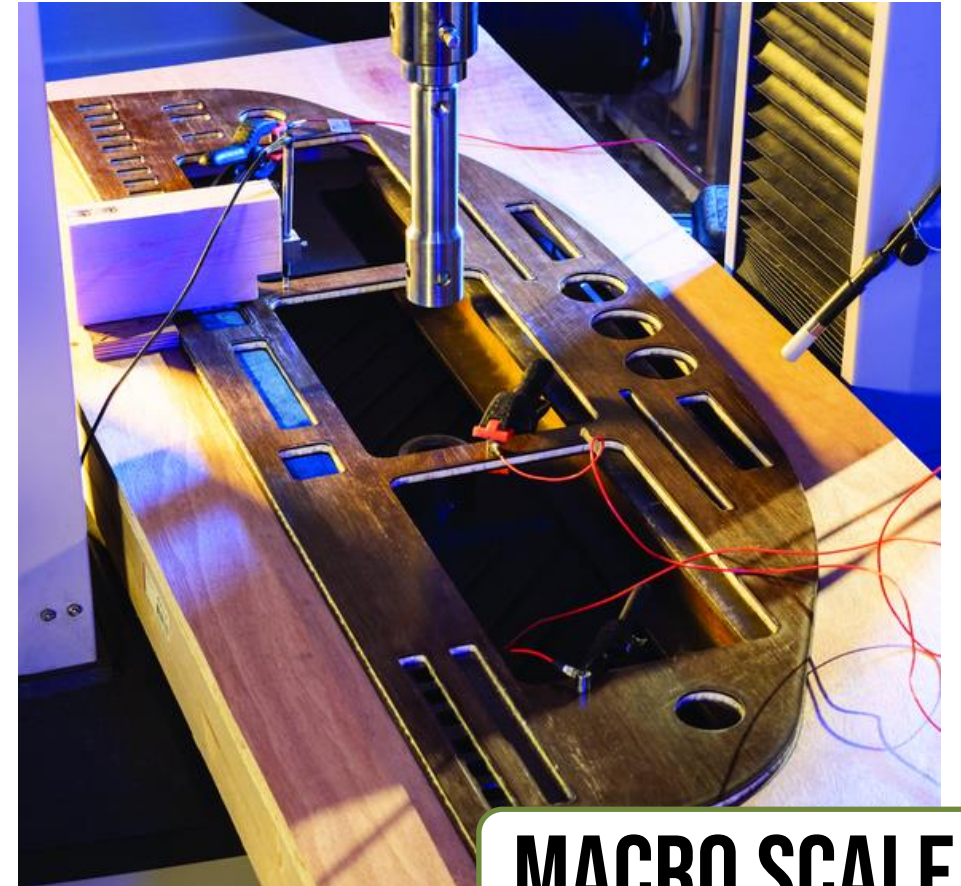


MICRO SCALE

NANOINDENTATION TEST



PLANE COCKPIT HEMP FIBRE REINFORCED COMPOSITE



MACRO SCALE

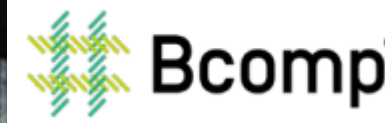
CARBON-FREE FUTURE, APPLICATIONS FOR TOMORROW

PUZZLE X **2023**

SCOOTER FAIRING MADE OF HEMP FIBRE COMPOSITE



CAR HOOD/ROOF/INTERIOR MADE OF FLAX FIBRE COMPOSITE



AIRCRAFT INTERIOR MADE OF FLAX FIBRE COMPOSITE



SPEAKER FAIRING MADE OF HEMP FIBRE COMPOSITE



CATAMARAN MADE OF 50% OF FLAX FIBRE

PUZZLE XTM 2023

EXPONENTIAL TECHNOLOGIES
EXPONENTIAL FUTURES

THANK YOU !

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ANIMATION: BLANDINE GUICHARDAZ

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