

Contributions to the understanding of dissipation phenomena in plant based composites

Tsilat Shiferaw, Pauline BUTAUD, Morvan OUISSE, Vincent PLACET

Start in October 2023



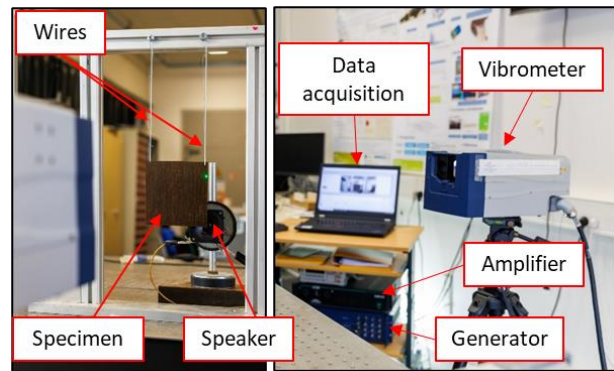
Objectives:

- Understand the damping mechanisms in plant fiber composites
- Achieve an optimal stiffness–damping balance by controlling fiber volume fraction

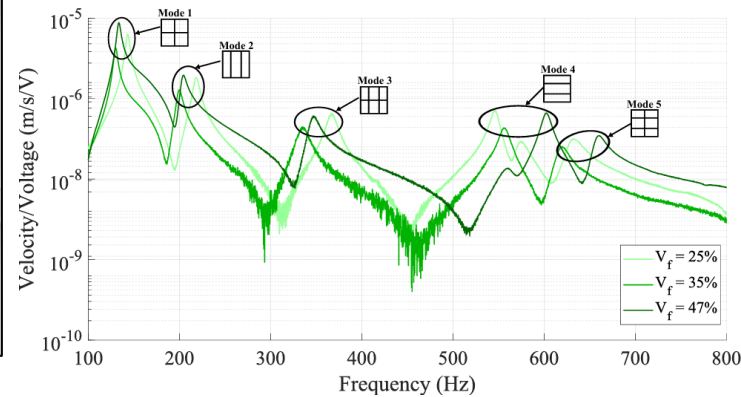
Methods:

- **Experimental approach** to validate the model and assess the viscoelastic properties of plant fiber composites at the structural level through DMA and vibration test under different temperature and humidity

Vibration experimental setup

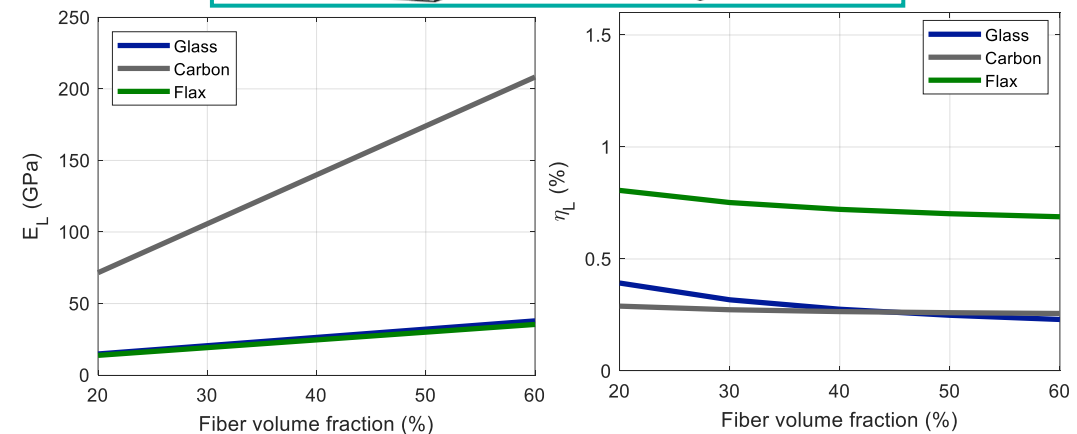
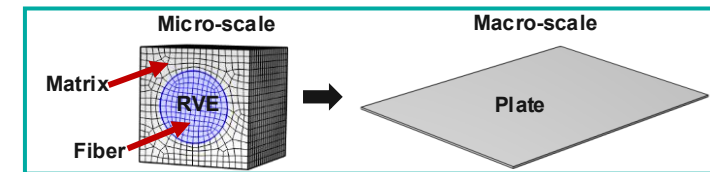


FRFs from vibration tests of flax–GreenPoxy plates at different fiber volume fractions



- Each peak represents a distinct mode used for damping identification
- Longitudinal damping value is constant across the V_f

- **Multiscale modeling** to predict the viscoelastic properties of plant based composites at the scale of the constituent and the structural level



- Damping in flax/GreenPoxy composite is 3 times higher than synthetic fiber ones
- Good stiffness-to-damping trade-offs in flax/GreenPoxy