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Effect of carbon nanotube interleaves on the flexural behaviour of CFRP composites

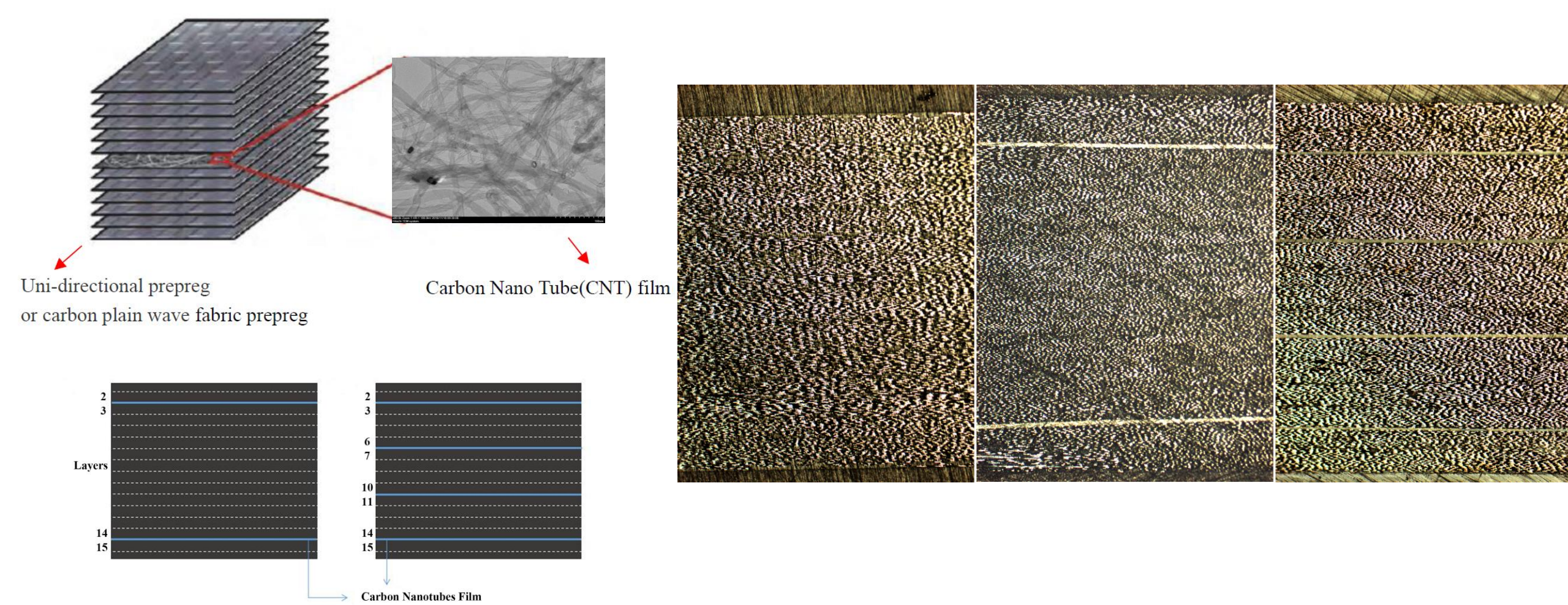
Karthik Ram Ramakrishnan, Zhifang Zhang

CONTEXT

- ❑ Multi-scale or hierarchical composites provide improved structural properties such as excellent delamination resistance and in-plane mechanical properties
- ❑ Nano-scale reinforcements such as carbon nanotubes (CNT), carbon nano fibres (CNF), graphene or nanoclay
- ❑ CNT films are highly porous two-dimensional CNTs network structures that are emerging as an effective way for introducing nano-reinforcements in composites as interleaves.

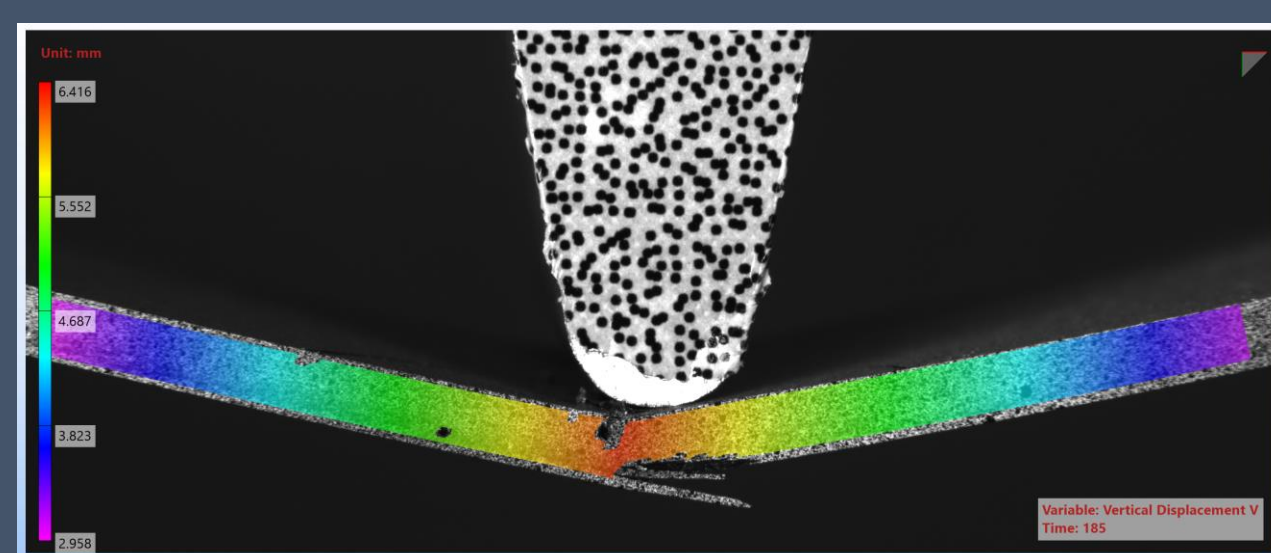
AIM

To study the effect of CNT film interleaves on the flexural behaviour of CFRP composites.

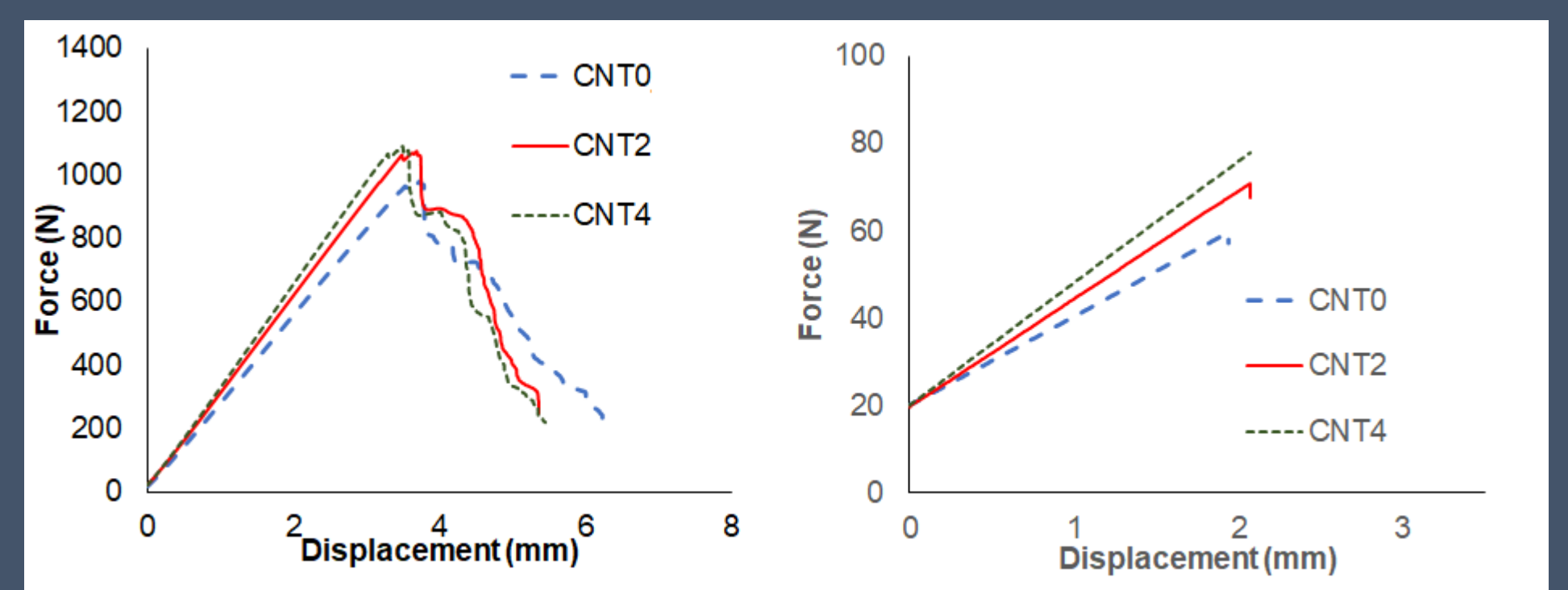


- 10-15 micron thick CNT films
 - Synthesized, composed, collected and deposited in a reactor by Floating Catalyst Chemical Vapor Deposition (FCCVD)
- Three different types of CNT-FRP laminates were manufactured (CNT0, CNT2, and CNT4)
- Flexure tests and impact tests conducted

Flexure testing

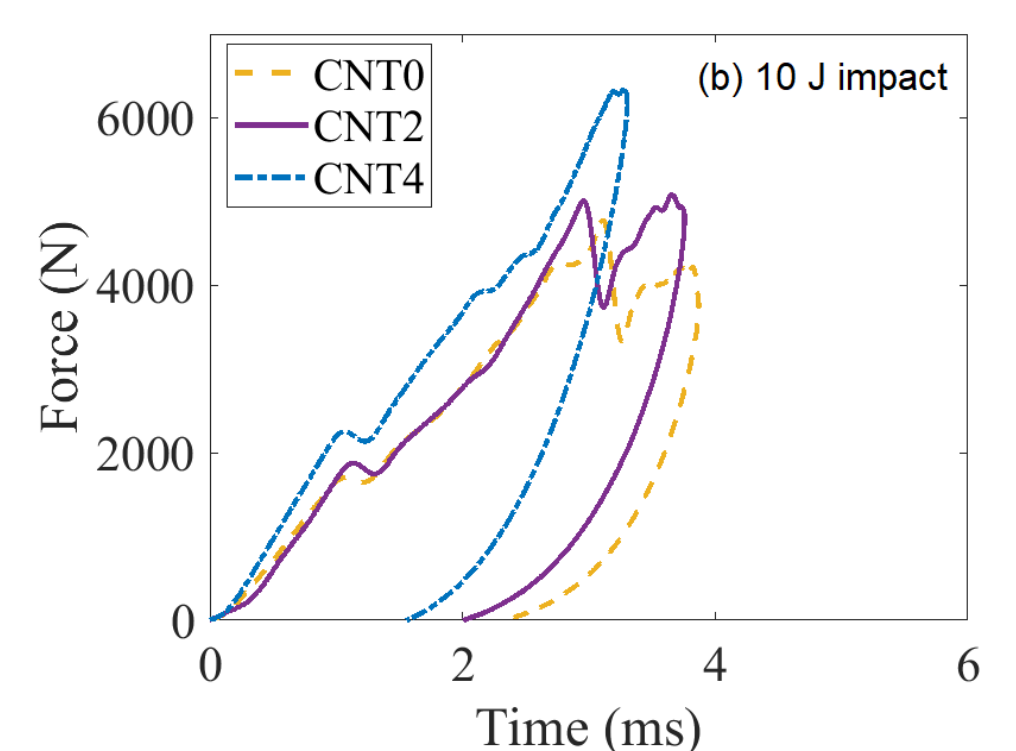
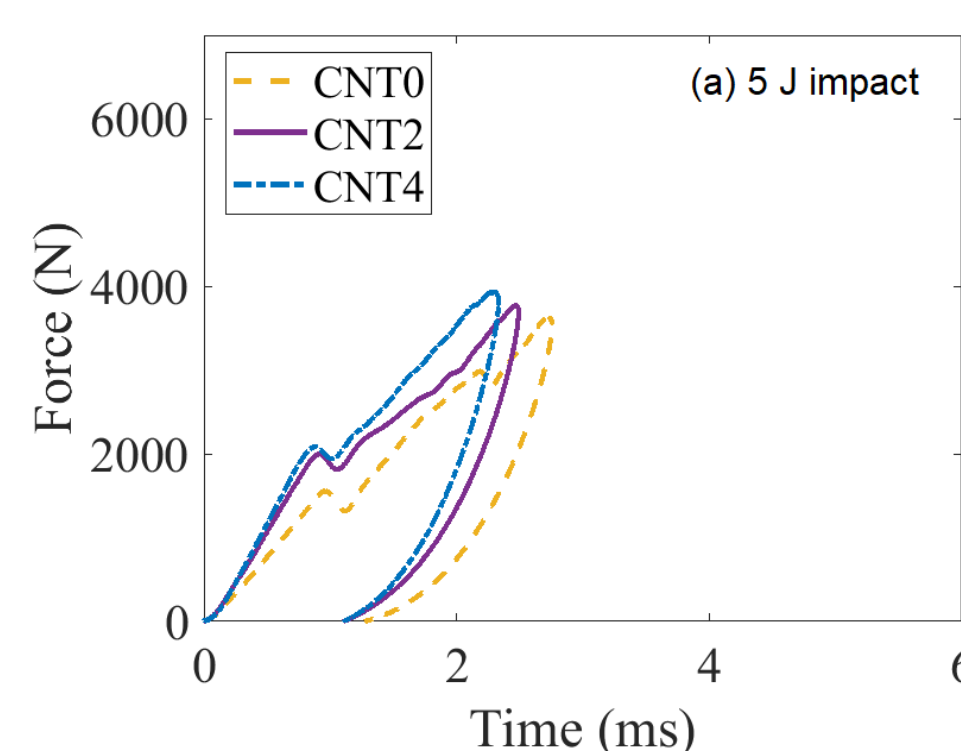
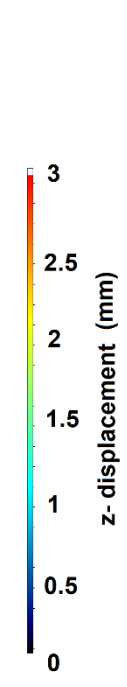
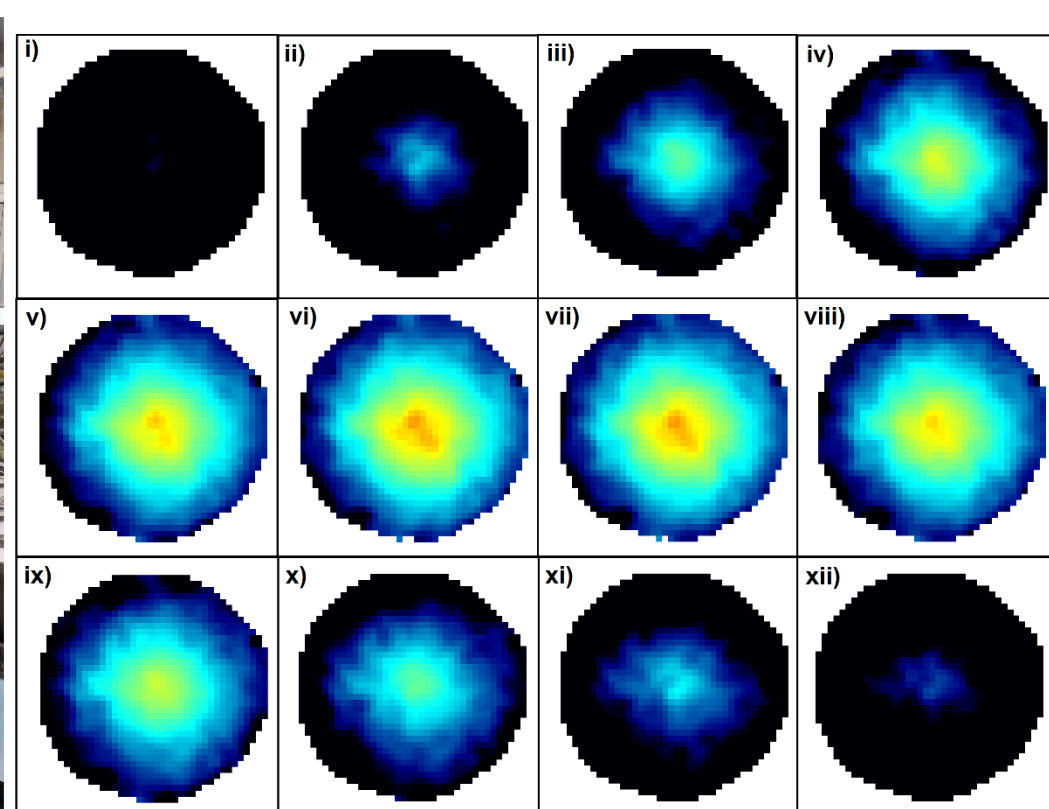


- Flexure tests on 0 UD and 90 UD composites
- Diameter of indenter – 5 mm
- Span 60 mm



- Effect of CNT films on delamination and matrix cracking
- Improvement of ~10% with 4 interleaves of CNT film

Impact testing



- Low velocity impact testing conducted using Drop tower