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Textile structures with negative Poisson's ratio

Textile structures with negative Poisson's ratio are a special class of textile materials. Known as auxetic textiles, they transversally expand when axially stretched or transversally contract when compressed. This nonconventional deformation behavior leads to a series of special properties of textile structures such as formation of dome shape under out of plane bending, increase of pore opening effect under extension, enhancement of energy absorption ability and indentation effect under impact force, etc. In this talk, different types of textile structures with negative Poisson's ratio which have been recently developed at PolyU will be presented, including auxetic plied and braided yarns, 2D and 3D auxetic weft and warp knitted fabrics, uni-stretch and bi-stretch auxetic woven fabrics, and 3D auxetic textile structure and composites.

Auxetic behavior and mechanical properties of these textile structures obtained from both experimental and theoretical analyses will be discussed. In addition, potential applications of auxetic textiles in different areas will be demonstrated.

Biography

Hong Hu is currently a full Professor at The Hong Kong Polytechnic University and Research Committee Chair of Institute of Textiles and Clothing. He is internationally known for his leading research work on 3D textile structures for composite reinforcement and auxetic textile materials for technical applications. He has over 250 publications that have been cited over 3900, and his publication H-index is 35 (Scopus). He has been serving as an editorial board member of various journals.

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