



Giuseppe Puglisi

A multiscale approach for material softening and residual strains in soft materials with unfolding domains

Venerdì 8 luglio, ore 11:30

Abstract

We present a “robust” multiscale model for protein materials constituted by macromolecules undergoing strain-induced unfolding effects. To analyze the effectiveness of the model we tested the macroscopic cyclic behavior of spider silks and of a keratin proteins such as human, cow and rabbit hairs. By adopting experimental values of the macromolecular material parameters, we show that the model reproduces with surprising accuracy the obtained experimental behavior with a strongly non linear damage and large permanent stretches.

The proposed approach represents in our opinion a significant step forward also in the design of new bioinspired history dependent materials.

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Short BIO

Giuseppe Puglisi is professor of Mathematical Physics at Politecnico di Bari since 2015. He was previously assistant professor in Solid and Structural Mechanics at the same university. He obtained his PhD in Structural Mechanics at the University of Trento and Ferrara under the supervision of Prof. G. Del Piero and Prof. L. Truskinovsky . He is member of the Society of Natural Philosophy as well as of the Italian Group of Mathematical Physics (GNFM).

His research interests are in mechanics of soft active materials and continuum mechanics.