

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Composite fiber networks mechanics** CATALIN PICU, ALI SHAH-SAVARI, Rensselaer Polytechnic Institute — Random fiber networks are present in many soft biological and engineering materials. In most cases, these networks are composite, in the sense that they are constructed from multiple fiber types. In this work we develop elements of a theoretical understanding of the elasticity of these structures. To this end, we consider systems made from a softer base and varying fractions of stiff fibers and investigate the effect of various system parameters on the overall behavior. The small strain elasticity depends strongly on the presence of a small concentration of stiff fibers for some types of base networks, but is essentially insensitive to these additions for other types. The way in which the stiff fibers are cross-linked to the soft fibers and to themselves is also important. These issues will be discussed within a framework general enough to make the conclusions relevant for diverse applications.

Catalin Picu  
Rensselaer Polytechnic Institute

Date submitted: 15 Nov 2013

Electronic form version 1.4