

## **Extreme Structures in Composites**

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In theory of composites or micro-structures, it is important to find inclusion shapes with special property. In relation to such shapes, Eshelby showed that an ellipsoidal shape, which produces the minimal energy, has internal uniform strains for any given uniform loading and then conjectured that ellipsoids are the only shape (structure) with such a uniformity property. The speaker will present some recent results on this Eshelby's conjecture. He and his collaborators also consider a coated structure called neutral inclusion, the insertion of which does not perturb the given outside uniform field. Hashine showed that some confocal ellipsoids are neutral inclusions and used them to construct a composite having a given effective property. The speaker will investigate the question whether confocal ellipsoids are the only structure of such. Some positive answers will be presented.