

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Mechanics and optics of stretchable microlenses for artificial compound eye camera ZHENGWEI LI¹, JIANLIANG XIAO², University of Colorado Boulder — Due to the wide-angle field of view, low aberrations, high acuity to motion and infinite depth of field, insect eye-inspired imaging devices have attracted more and more interest. Recently, researchers have developed an imaging device that resembles the structure and functions of insects' apposition eyes. Elastomeric microlens array that can be mechanically stretched to very large extent without deteriorating the optics is critical to this development. The stretchable microlens array is composed of a number of hemispherical microlenses each sitting on top of a pedestal and connected through a continuous elastomeric film. Here we present our study on mechanical and optical aspects of stretchable microlens. Our results show that proper designs of the hemispherical microlens, pedestal and film are critically important to meet both mechanical and optical requirements simultaneously. Our study can have important implications in not only the design of artificial compound eye cameras, but also other developments that require stretchable optical elements.

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Date submitted: 15 Nov 2013

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