Tropical beetle has the brightest whites（图）

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[摘要] 10 January 2007. The bright colours of certain insects are normally down to either a strong pigmentation or a highly periodic structure. But these properties cannot be responsible for insects with brilliant white shells, because white light needs a scattering process that covers all the visible wavelengths.
[关键词] Tropical beetle

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The bright colours of certain insects are normally down to either a strong pigmentation or a highly periodic structure. But these properties cannot be responsible for insects with brilliant white shells, because white light needs a scattering process that covers all the visible wavelengths.

This mystery encouraged Pete Vukusic and his colleagues from Exeter University in the UK to investigate Cyphochilus, a species of beetle reasoned in entomological circles for its unusually bright white shell. After examining electron microscope images of the shell's interior, they discovered a network of nanoscale protein filaments that were completely devoid of any periodicity. These unordered filaments have a very different refractive i

Although randomness is the key to scattering white light, the aperiodic structure of Cyphochilus does it much more efficiently than many other insects, such as the common Cabbage White butterfly. Vukusic said the reason for this efficiency is that the filaments are less crowded, so the light can "see" individual filaments. However, he added that if crowding were reduced further it would diminish the scattering itself. "It's a fine line, but thi

The physicists now think that their discovery could lead to a new generation of bright white materials, which cannot currently be made as thin as the beetle's five

-micrometre shell.

"Synthetic materials can already produce spectacularly white light," Vukusic told Physics Web. "It's not that nature is doing something much better than we can, it is just doing something much thinner."