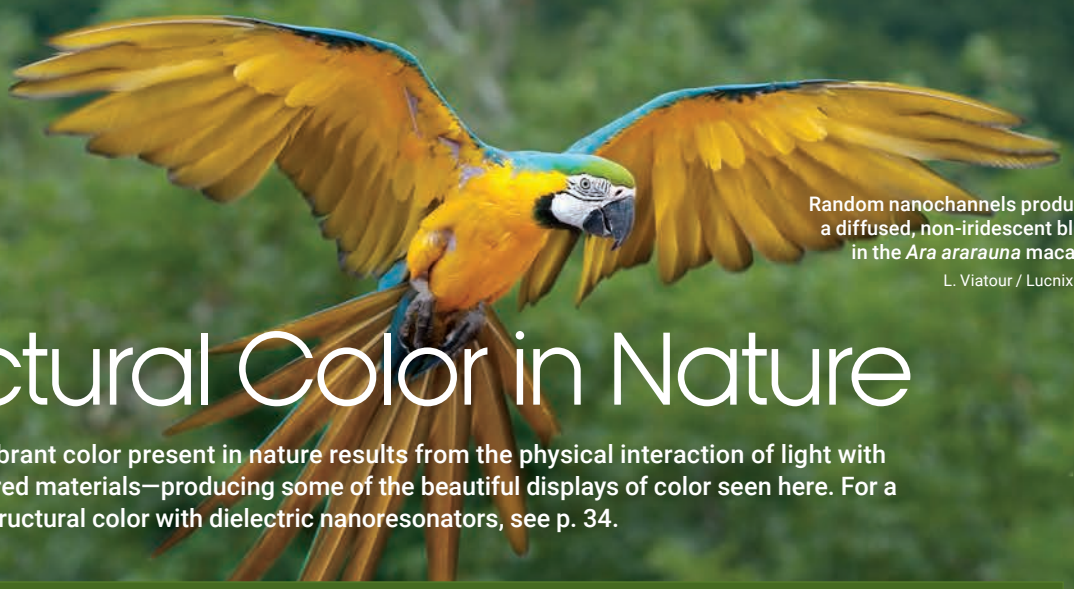


Random nanochannels produce a diffused, non-iridescent blue in the *Ara ararauna* macaw.
L. Viatour / Lucnix.be

Structural Color in Nature

Much of the vibrant color present in nature results from the physical interaction of light with nanostructured materials—producing some of the beautiful displays of color seen here. For a look at creating structural color with dielectric nanoresonators, see p. 34.

Diffraction gratings

Layers of chitin and air form diffraction gratings that contribute to the iridescent colors of many butterfly wing scales and bird feathers.

Merops apiaster, guêpier d'Europe
Elgollimoh

Morpho peleides, blue Morpho
P. Kirillov

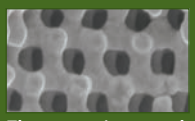
Tree-shaped arrays of chitin in the wing scales of *Morpho peleides* produce diffraction gratings that result in its beautiful blue coloring.

Parotia sefilata, bird-of-paradise
mihir_joshi / Getty

V-shaped barbules in *Parotia sefilata*'s brightly colored breast feathers create thin-film microstructures that reflect blue-green and orange-yellow.

Entimus imperialis weevil
whaldener_endo

Iridescent scales

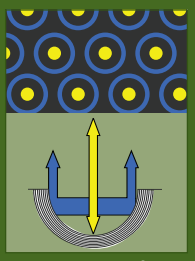


Electron micrograph of the 3D crystals

Photonic crystals

The chitin exoskeleton of the *Entimus imperialis* weevil is covered in iridescent scales that contain diamond-based crystal lattices oriented in all directions, creating a vibrant green.

Papilio palinurus, emerald swallowtail
G. Nicolas



Wing scale surface and section of bowl

Selective mirrors

The wing scales of the *Papilio palinurus* butterfly have microscopic bowl-shaped pits lined with layers of chitin that reflect yellow directly and blue from the sides, resulting in a dramatic green.

Pollia condensata marble berry
T. Harris

Spiral coils

The marble berries of *Pollia condensata* have a spiral structure of cellulose fibrils that scatters light, creating a brilliant blue.

Hapalochlaena lunulata
J. Petersen

Variable structures

When the *Hapalochlaena lunulata* octopus is provoked, its dermal chromatophore cells become bright yellow, while neural-controlled iridophore rings flash iridescent blue.

Aphrodita aculeata, sea mouse
M. Maggs

Crystal fibers

The hollow nanofiber bristles of *Aphrodita aculeata*, a species of sea mouse, reflect light in yellows, reds and greens to warn off predators.

Sources: Wikipedia and Wikimedia Commons; CC-BY-4.0 / Photonic crystal insets: S.R. Mouchet and J.F. Colomer / Selective mirror insets: C. Chap / Infographic by Alessia H. Kirkland