Photonic Crystal

Why in News?

A soft tunable **photonic crystal with enhanced thermal stability and optical purity** developed by researchers that reflects vivid colours in the visible spectrum has **potential applications in making more durable and better reflective displays and laser devices.**

What are Photonic Crystals?

- **About:**
  - Photonic crystals are **optical nanostructures in which the refractive index changes periodically.**
    - Refractive index, also called index of refraction is the measure of the bending of a ray of light when passing from one medium into another.
  - This affects the **propagation of light in the same way that the structure of natural crystals gives rise to** X-ray **diffraction** and that the atomic lattices (crystal structure) of semiconductors affect their conductivity of electrons.
  - Photonic crystals **occur in nature in the form of structural coloration and animal reflectors.**
    - Examples found in nature include **opal, butterfly wings, peacock feathers,** etc., exhibiting distinct iridescent colours.
- **Uses:**
  - Photonic crystals promise to be **useful in a range of applications ranging from reflection coatings to optical computers** when artificially produced or engineered in laboratories.
  - They **enable the PCs to exhibit structural colours in the visible spectral regime.**
  - Researchers have also been on the **constant lookout for tuning the properties in-situ post-fabrication.**
  - The development of advanced photonic materials and devices using **Liquid Crystals (LC) that exhibit self-organization,** phase transitions, and molecular orientation behaviors in response to external stimuli is attracting significant interest.

Source: PIB