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Media Structured for Nonlinear Optics

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Since the first demonstration of nonlinear optics (second harmonic generation) it is known that it cannot happen in free space: these processes need a medium interaction to happen. It is very common to see lasers with inbuilt frequency conversion enabled by nonlinear crystals. Those crystals, for example, are a medium specifically tailored to maximize the conversion of one specific wavelength into another. This tailoring can go from the microscopic size of the crystal cells to the macroscopic orientation of their cutting angles. In this work we compiled the different materials used to enable nonlinear optical processes and the physical mechanisms that are behind this. We observed that many different media can be used, including sparse gas jets, cold atoms, crystals, metasurfaces, dielectric micro resonators, and many others. These materials present different optical phenomena such as high-harmonic generation, frequency conversion and cross-wavelength modulation. This summary can inspire the development of new structure materials for novel optical devices.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/a

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