

Nematrian Website Pages on Optics

[Nematrian website page: [PhysicsOptics](#), © Nematrian 2015]

Sight is one of the core senses that we humans possess. Probably, it is the one you are using right now as you refer to this page. Without it and the light on which it depends we would, literally, be blind. Without sunlight, life as we know it here on earth would not be possible.

It is therefore not surprising that optics, i.e. the study of light, has long been one of the core branches of physics. It has become even more important in recent times, following the realisation that visible light is a form of electromagnetic radiation. Other parts of the electromagnetic spectrum include radio waves, microwaves and X-rays. Indeed, the electromagnetic force is now understood to be one of the handful of fundamental forces of nature that characterise how the physical universe behaves.

The intimate connection between optics and other branches of physics has long been apparent. Galileo discovered the moons of Jupiter using a telescope, thereby cementing the Copernican revolution in how we view the Earth's place in the universe. Newton developed the wave-theory of light, and hence our understanding of how white light consists of light of many different frequencies and hence colours. In 1905, Einstein wrote on the photoelectric effect, thereby showing that light is quantised, i.e. exists in the form of photons, underpinning the development of quantum mechanics, one of the most important scientific advances of the twentieth century. In the same year, Einstein also developed his theory of special relativity, by developing the implications of light always travelling at a constant speed.

In due course, we are hoping to expand the Nematrian website's coverage of the incredible wealth of understanding of optics that illustrious scientists such as these have bequeathed to us. In the meantime, the Nematrian website concentrates on one tightly defined topic in which one of its directors filed a patent, which is the question of how practical it is to achieve arbitrarily high resolution with a microscope, telescope or photolithographic device, see [high resolution extended image near field optics](#).