

Newton rings:

Newton's rings : **is a phenomenon in which an interference pattern is created by the reflection of light between two surfaces(a spherical surface and an adjacent flat surface)**. It is named after Isaac Newton, who first studied them in 1717. When viewed with monochromatic light, Newton's rings appear as a series of concentric, alternating bright and dark rings centered at the point of contact between the two surfaces. When viewed with white light, it forms a concentric-ring pattern of rainbow colors, because the different wavelengths of light interfere at different thicknesses of the air layer between the surfaces.

How the interference fringes form:

The light rings are caused by constructive interference between the light rays reflected from both surfaces, while the dark rings are caused by destructive interference. Also, the outer rings are spaced more closely than the inner ones. Moving outwards from one dark ring to the next, for example, increases the path difference by the same amount, λ , corresponding to the same increase of thickness of the air layer, $\lambda/2$. Since the slope of the convex lens surface increases outwards, separation of the rings gets smaller for the outer rings. For surfaces that are not convex, the fringes will not be rings but will have other shapes.

The radius of the N^{th} Newton's bright ring is given by

$$r_N = \left[\left(N - \frac{1}{2} \right) \lambda R \right]^{1/2},$$

