

600 year old pinhole camera in Indian temple: How ancient architects built it centuries before modern optics

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India is a land of incredible temples, and each has its own unique story, architecture, and cultural importance. Some temples are known for their sheer size and grandeur, while others fascinate visitors with their mysterious and scientific features hidden in plain sight. Among these wonders is a temple in Hampi, Karnataka, that surprises visitors not just with its spiritual importance but also with a surprising natural phenomenon that resembles a centuries-old optical device. This temple houses a scientific principle that creates an inverted image of its towering entrance. The fusion of faith, art, and science here creates an experience that brings in curiosity

The 600-year-old pinhole camera of the Hampi temple

Nestled in the historic town of Hampi, Karnataka, the Virupaksha Temple stands as proof of the grandeur of the Vijayanagara Empire and centuries of devotion to Lord Shiva. While the temple itself is an architectural marvel, it also has an ancient pinhole camera effect that projects an inverted image of its own majestic gopuram or entrance tower inside a small dark chamber.





What is a pinhole camera effect?

This effect occurs through a tiny hole in the temple's wall, which acts as a natural aperture. According to scientific principles, when light passes through a small opening, it projects an inverted image of the object outside onto the opposite surface inside, just like a camera obscura. Tourists visiting the temple are often surprised to find a clear, upside-down image of the towering gopuram reflected on the opposite wall in this dimly lit space. The phenomenon is clearly visible because the chamber is mostly dark, allowing the bright image formed by the small hole to stand out.

The temple's architecture was designed in such a way that this optical phenomenon wasn't accidental but a deliberate inclusion of early knowledge of light and physics. The distance between the aperture or the pinhole and the image surface is crucial, and it follows the principle that the aperture size should be about 1/100th of this distance to create a clear inverted image.

Historical and cultural significance of Virupaksha Temple

Virupaksha Temple is part of the UNESCO World Heritage Site known as the Group of Monuments at Hampi. Dedicated to Lord Virupaksha, a form of Shiva, the temple has roots dating back to the 7th century, evolving

through Chalukyan, Hoysala, and most prominently Vijayanagara empires. It is one of the few structures in Hampi that has remained intact over centuries, continuing to serve as a sacred pilgrimage site.



The temple complex has several architectural highlights, including the grand nine-tiered eastern gopuram, standing about 50 meters tall, to detailed pillars and courtyards. The temple was extensively visited by Vijayanagara rulers, especially Krishnadevaraya, who contributed significantly to its expansion and embellishment in the early 16th century.

Mathematics and art in temple architecture

One of the most outstanding features of the Virupaksha Temple is the use of mathematical concepts such as fractals in its design. The temple's triangular structure shows repeated patterns that divide and repeat as one looks upwards, much like natural fractals seen in snowflakes or leaves.