

# Shadow of the Supermassive Black Hole in M87: EHT observations and theoretical interpretation

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The Event Horizon Telescope has mapped the central compact radio source of the elliptical galaxy M87 at 1.3 mm with unprecedented angular resolution. These images show a prominent ring with a diameter of  $\sim 40$  micro-arcsecond, consistent with the size and shape of the lensed photon orbit encircling the “shadow” of a supermassive black hole. Recently EHT has provided new images of the polarised emission around the central black hole in M87 on event-horizon scale. This polarised synchrotron emission probes the structure of magnetic fields and the plasma properties near the black hole. We found that the net azimuthal linear polarisation pattern may result from organised, poloidal magnetic field in the emission region. In a quantitative comparison with a large simulated polarimetric image library, we found that magnetically arrested accretion disks is favoured to explain polarimetric EHT observations. In this talk, I also discuss about the testing theory of gravity from the black hole shadow image by EHT and future ngEHT.

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