Credit: Y. Hézaveh (Stanford University); ALMA (NRAO/ESO/NAOJ); Hubble Space Telescope (NASA/ESA) | **Antennas photo:** José Francisco Salgado (ESO)

GRAVITY BENDS LIGHT FROM A DISTANT GALAXY AND TURNS IT INTO A RING

All curved mirrors distort the image they reflect. The same is true for photographic lenses. A team of astronomers used ALMA to produce a strange «photograph» of a very far-away galaxy (SDP.81), which also looks quite distorted because it was observed through a cosmic lens.

We are talking about a very far-away galaxy located 12 billion light-years away. There is another galaxy between this one and the Earth, about 4 million light-years away. This causes the image of the farther galaxy to be distorted by the gravity of the galaxy located between it and our galaxy. Astronomers call this effect *gravitational lens*.

In the case of galaxy SDP.81, the effect of the gravitational lens is extreme. Light from the distant galaxy is bent into a ring shape, and ALMA produced an extremely detailed image of this ring. Now astronomers will try to discover what this galaxy is really like, without the distorted effect of the gravitational lens.

Far from being a hindrance to astronomers, gravitational lenses are actually a huge help because —due to the distortions they produce— they allow astronomers to see the brightest galaxy and study it in detail.

In this composed image, red arcs represent the most distant galaxy and the blue object in the center is the nearer galaxy that acts as a lens. The white point is a dark dwarf galaxy prowling around. This finding sets a precedent that will enable ALMA to find many more similar objects and may help astronomers to find answers to important questions regarding the nature of dark matter.