



<p><b>ESOCast Episode 32: Most Distant Quasar Found</b></p>	
<p>00:00  <b>[Visuals start]</b></p> <p><b>[Dr J]</b>          1. Using ESO's flagship Very Large Telescope, along with other telescopes around the world, a team of European astronomers has discovered the most distant quasar ever recorded!</p> <p>By studying this blazing beacon in detail the scientists have found that we are seeing this quasar at a time when the universe was just 770 million years old. This means that the light from the quasar took 12.9 billion years to reach us.</p> <p>Never before has a brighter object been observed this far back into the early Universe.</p>	<p><b>Images:</b></p> <p>Zoom-in to quasar</p>
<p>00:41  <b>ESOCast intro</b>          2. This is the ESOCast! Cutting-edge science and life behind the scenes of ESO, the European Southern Observatory. Exploring the ultimate frontier with our host Dr J, a.k.a. Dr Joe Liske</p>	<p>ESOCast introduction</p>
<p>01:01  <b>[Dr J]</b>          3. Quasars are very brilliant distant galaxies powered by supermassive black holes at their centres. These amazing objects have the mass of millions of suns crammed into spaces as small as our Solar System.</p> <p>The quasar phenomenon transforms ordinary galaxies into what astronomers have fittingly dubbed 'angry monsters' — the most luminous of all objects in the universe.</p> <p>And ESO's Very Large Telescope, better known as the VLT, helped to discover the farthest of these impressive objects ever observed.</p>	<p>Generic Quasar animations</p> <p>VLT</p>

<p>01:34  <b>[Dr J]</b>  4. Back in the early Universe galaxies contained much more gas and dust than we see in them today. Gradually material was used up in the formation of stars and planets, and less was available to feed the supermassive black hole, the process that creates the impressive jets of a quasar.</p>	<p>Galaxy zoom-in from ESOcast 22</p>
<p>01:52  <b>[Dr J]</b>  5. Objects far back in the early Universe, like the newly recorded quasar, cannot be observed in visible light. By the time it reaches our detectors on Earth the expansion of the Universe has stretched the light so much that it falls mainly into the infrared part of the spectrum.</p> <p>In addition, quasars in the early universe are extremely rare and so in order to find this object in the first place a team of astronomers had to spend five painstakingly years closely examining huge lists of possible objects from an infrared survey made by the UKIRT telescope — before they finally struck gold.</p>	<p>VLT night timelapse</p>
<p>02:32  <b>[Dr J]</b>  6. With such an exciting discovery the team could take no chances; they had to validate their findings.</p> <p>Using the FORS2 instrument on the VLT, along with instruments on the Gemini North telescope, a redshift of 7.1 was confirmed. This corresponds to such an extraordinary distance that it took the light from the quasar 12.9 billion years to reach us.</p>	<p>VLT</p> <p>VLT, possibly with FORS</p>
<p>02:59  <b>[Dr J]</b>  7. Despite the vast distance, the quasar's extreme brightness made it possible to identify other characteristics using the same two telescopes.</p> <p>It was determined that the black hole powering the quasar has a mass of about two billion times that of our own Sun. This is an extraordinary mass for an object so early in the Universe.</p>	<p>Martin's new animation</p>
<p>03:22  <b>[Dr J]</b>  8. Since current estimations say there should only be around 100 bright quasars at this distance across the entire sky, finding this object was a huge challenge. It was a great bonus that it has proved to be even more distant than the astronomers expected.</p> <p>This quasar is a vital probe into the early Universe and will help us understand how black holes grew just a few hundred million years after the Big Bang.</p>	<p>Quasar animation</p>

03:50

[**Outro**]

ESOcast is produced by ESO, the European Southern Observatory.

ESO, the European Southern Observatory, is the pre-eminent intergovernmental science and technology organisation in astronomy designing, constructing and operating the world's most advanced ground-based telescopes.

04:50

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