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| **Hubblecast Episode 63: From the distant past — Hubble and art** | | |
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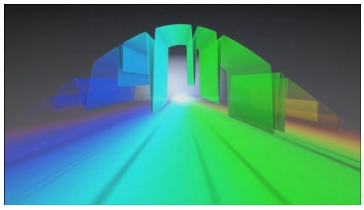
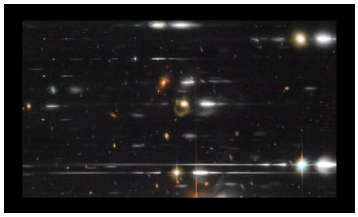
| 00:00<br>[Narrator]<br>1. Hubble's images often look like works of art. But as we discovered in Episode 59, the nuts and bolts of astronomers' work with Hubble is often not so visual.<br><br>Spectra — the graphs of the distribution of colours within an observation — are a powerful tool for studying the Universe. But because they don't look visually arresting, it's usually just the scientists who see them. | |  |
| 00:31<br>Hubblecast intro | |  |
| 00:52<br>[Narrator]<br>2. To astronomers, spectra have an elegance that equals Hubble's prettiest pictures.<br><br>They might not be as attractive as pictures of galaxies or nebulae, but for astronomer Bob Fosbury and conceptual artist Tim Otto Roth, they can still be works of art. | |  |
| 01:14<br>[Bob Fosbury]<br>3. I'm always thinking about ways of explaining what scientists actually do and how they come up with these really rather profound facts about the Universe. And the tools we use are of course very sophisticated, and they sometimes produce data which are not very visually appealing, attractive or understandable.<br><br>And so, one of the main tools that astronomers use and have used for many, many years is spectroscopy. The spectra themselves are full of information to somebody like me, an astronomer, but that information is not obvious to the viewer. | |  |
| 01:56<br>[Narrator]<br>4. Roth and Fosbury have worked to build a work of art about the oldest colours in the Universe, using Hubble's spectra of distant galaxies. | | |

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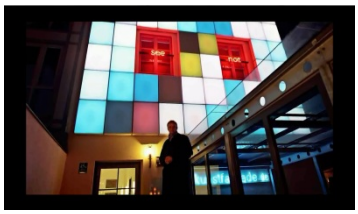
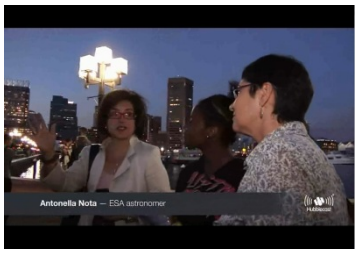
| Using a green laser, Roth's installation projects Hubble spectra of distant galaxies and quasars as an animated light wave.<br><br>It's been exhibited in a number of cities in Europe and the USA, including its premiere here in Venice in 2010…<br><br>… and more recently on the dome of the Hayden Planetarium here in New York.<br><br>But why would an artist be interested in projecting spectra? | |  |
| 02:36<br>[Tim Otto Roth]<br>5. I think people are attracted in a way by the projection. They see, well, they have anthropomorphic associations. They probably see a brainwave, or a heartbeat, so people stop and get interested in that. And that's important. And they're puzzled, and they start to reflect: "Well, what's going on there?" | |  |
| 03:04<br>[Narrator]<br>7. As a conceptual artist, Roth is interested in the concept of colour; how it is reproduced, and how it is represented.<br><br>In the past, he has worked with CCDs — the type of chip that detects light in Hubble — and has used individual coloured pixels taken from astronomical observations.<br><br>This work of art goes a step further: the projection is in just a single shade of green — but the peaks and troughs in the lines represent thousands of colours observed in thousands of the most distant objects ever observed by science. | |  |
| 03:58<br>[Member of the public]<br>8. Would you be able to go into the signs there and interpret what it actually means?<br><br>[Antonella Nota]<br>You could. You're seeing basically a randomly selected 1200 objects, so I wouldn't be able to say off by heart which one you're looking at. But by and large, if you put a couple of astronomers here like myself, in a few minutes they would be discussing, "That's H-alpha, that's hydrogen, that's nitrogen, I can see the wavelength".<br><br>[Member of the public]<br>Yeah, I'm learning!<br><br>[Antonella Nota]<br>Every position has a corresponding element. | |  |
| 04:36<br>[Tim Otto Roth]<br>9.<br>Well, it's important, I think, for the art to reflect concepts like colour and the image. This is what art has done for the last 500 years. We had movements also in the 20th century - we have concept art, we have colour field paintings - and in a way, *From the Distant Past* brings this together, | | |

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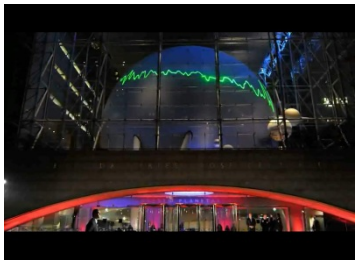
| reflecting the concept of colour with a very conceptual formal approach.<br><br>What you see here is the heartbeat of the primordial Universe. This is very early colour information; it's the oldest colour information we have; it's the oldest light information we have, travelling for billions of years across the Universe. And it tells us of the origins of the Universe. | |  <br>  |
| 05:36<br>[Bob Fosbury]<br>10. Well, I think the interaction between the art and the science is very interesting, and it's something I'm learning about. But I think the art has a way of accessing the profound idea. I mean, the science is a way of exploring a profound idea, making the observations, making the deductions, painting the picture of the way the Universe works.<br><br>I think, for me, the art adds a very valid channel from this scientific work to present the profound idea in a way that has impact to people. And it's a way of doing it where you don't have to explain all the intricate detail of what is actually being done. You can say, "Hey, what you're seeing was captured by a telescope in orbit, from photons which had left galaxies in the very early Universe and then have been detected. So you're looking at the very distant Universe as it was happening all of those billions of years ago." | |  <br>  |

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