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Hubblecast Episode 18: Hubble sees magnetic monster in erupting galaxy **FOR IMMEDIATE RELEASE 19:00 (CEST)/01:00 PM EDT 20 August, 2008**		
00:00 **[Visual starts]** **00:00** **[Narrator]** The Hubble Space Telescope has solved a long-standing puzzle by resolving giant but delicate filaments shaped by a strong magnetic field around the active galaxy NGC 1275. It is the most striking example so far of the influence of the immense tentacles of extragalactic magnetic fields. **00:20** **[Intro]** **00:38** **[Woman]** This is the Hubblecast! News and images from the NASA/ESA Hubble Space Telescope. Travelling through time and space with our host Doctor J a.k.a. Dr. Joe Liske. **00:49** **[Dr. J]** Hi and welcome to another episode of the Hubblecast! Today we are going to interrupt our series of seven Hubblecast Specials to bring you a breaking news story. Now this doesn't happen very often, but the subject of today's show is in fact completely invisible. And no, I'm not talking about dark matter, I'm talking about magnetic fields. Although most people are completely unaware of them, magnetic fields in fact surround us all the time. For starters, the Earth has a magnetic field of course, which any compass will show you. But power lines, and pretty much any electrical device also produces magnetic fields.		Image of galactic filaments Hubblecast logo Episode 18: Hubble sees magnetic monster in erupting galaxy Images of galactic filaments Images of compass and electricity pylon Images of compass and portable radio

And moreover, they're not just down here on Earth, they're also sprinkled throughout the Universe. Take our Sun for example. Particularly strong magnetic flares from our Sun can even disrupt radio communication down here on Earth, including your mobile phone calls and your favourite radio station.		Footage of Solar flares
01:43 **[Narrator]** In the direction of the constellation Perseus we find the Perseus Cluster of galaxies. NGC 1275 in its centre is one of the closest giant elliptical galaxies. Its most spectacular feature is the lacy filigree of gaseous filaments reaching out beyond the galaxy into the multi-million degree x-ray emitting gas that pervades the cluster. This is an active galaxy, hosting a super-massive black hole at its core, which blows bubbles of material into the surrounding cluster gas.		Zoom into the night sky, toward the constellation Perseus Continue zoom
Exploiting Hubble's view, a team of astronomers led by Andy Fabian from the University of Cambridge in the United Kingdom, have for the first time resolved individual threads of gas which make up the filaments.		Arrive at the Hubble image
02:31 **[Dr. J]** So the amount of gas in one of these threads is about one million times the mass of the Sun. They are only about 200 light-years across, but they are very straight, and they can extend for up to 20,000 light-years. These filaments are formed when cold gas from the core of the galaxy is dragged out in the wake of the rising bubbles blown by the black hole.		Images of filaments
But the really interesting thing is that these filaments appear to be able to survive for up to 100 million years. And that's what had astronomers really puzzled. How is it possible that these delicate filamentary structures can survive in the hostile high-energy environment of the galaxy cluster for so long? Either they should have heated up, dispersed and evaporated in a very short period of time, or if they are somehow shielded, they should have collapsed under their own weight and formed stars long ago.		Panning images of the filaments
03:21 **[Narrator]** The new study published in Nature on the 21st August 2008 gives the explanation. Magnetic fields provide a skeletal structure strong enough to resist gravitational collapse, preventing the filaments from forming into stars. These magnetic fields have been able to contain and suspend the peculiarly long threads for over 100 million years.		Simulation of magnetic field lines supporting the filaments
03:44 **[Dr. J]** Well, there you have it!		Images of galactic filaments
But why is it so important that scientists have resolved these fine filamentary structures? Well, first of all it's allowed them to finally measure the strength of an extragalactic magnetic field.		Panning images of the filaments

But in addition to that, these filaments are clear evidence of the intricate relationship between the central super-massive black hole and the surrounding cluster gas. Understanding this relationship provides us with important clues on how the giant black hole interacts with, and affects their surrounding environment. This is Dr. J signing off for the Hubblecast. Once again, nature has surprised us beyond our wildest imagination… **04:23** **[Outro]** **04:43 END**		Simulation of super-massive black hole Images of galactic filaments Hubblecast is produced by ESA/Hubble at the European Southern Observatory in Germany. The Hubble mission is a project of international cooperation between NASA and the European Space Agency.