

# On the Scent of a Pre-Historic Particle Accelerator?

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An international team of astrophysicists have used the H.E.S.S. telescopes to uncover the trail of a 10,000 year old supernova at the heart of the Milky Way. In a paper published in *Nature* (6th February 2006), they describe their discovery of high energy cosmic rays that have been through a cosmic accelerator - such as a supernova.

The H.E.S.S. telescopes in Namibia detect gamma rays, which are released when high energy particles known as cosmic rays collide with clouds of interstellar gas. Giant clouds of hydrogen gas, with more than 50 million times the mass of our Sun exist at the heart of the Milky Way (the galactic centre).

The cosmic rays from here are more numerous and more energetic than those seen throughout the rest of our galaxy. Their numbers are particularly high at the higher energies, suggesting that they have been recently (astronomically speaking) accelerated to high energy, producing corresponding high energy gamma rays when they collide with the cloud material. This is the first time any facility has been sensitive enough to detect that the clouds glow with very high energy gamma rays.

Candidates for such a cosmic accelerator are a stellar explosion (supernova) or a super-massive black hole. The H.E.S.S. team believe that their cosmic rays were created by a supernova that exploded in the last ten thousand years and is still producing a fading signal of new rays.

Dr Jim Hinton, a British scientist involved in the discovery working at

Heidelberg, concludes "This is only the first step. We are of course continuing to point our telescopes at the centre of the Galaxy, and will work hard to pinpoint the exact acceleration site I'm sure that there are further exciting discoveries to come"

Dr Paula Chadwick from the University of Durham said "A supernova explosion that took place inside the gas clouds at the centre of the galaxy around 10,000 years ago, looks the most likely source of the particles. Whilst the original event was most likely hidden from view from Earth, we can now see its after-effects in a stream of particles that have been accelerated in the massive explosion."

Source: PPARC

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