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Upper Left: Cosmic ray detectors waiting to be transferred to permanent positions. Lower Left: A cosmic ray telescope works in conjunction with the detectors. Right: The detectors are air-lifted into place with helicopters.

New detectors placed in the West Desert

Dana Jordan

Staff Reporter

The Cosmic Ray Center in Delta is expanding its area of research. The center deployed about seventy new detectors by helicopter to their permanent locations, south of the telescope observatory, near the Drum Mountains, on Feb. 22 and 23.

The detectors, about the size of ping-pong tables, are sprinkled across the desert west of Delta. They measure the remnants of cosmic ray showers as they hit the Earth's surface.

John Matthews, research professor and project manager of the Cosmic Ray Research Group, explained that unlike the low-energy particles from the sun, there are extremely high energy particles coming from space, which spill out light as well as charged particles.

"It is more energy than a super nova, and is 100 million times more energetic than those we can generate in the collider in Geneva," explained Matthews, "It could be something like two black holes swirling around each other, and emitting particles that don't get sucked in. We're trying to figure out exactly what it is, where they are coming from and how to make them."

Matthews explained that these cosmic rays are very rare, only emitting one per square kilometer per century or less, which is why they need a lot of area for their research.

"Millard County has a lot of flat space and it's dark out there. There's not a lot of light pollution or dust in the air," he said, "We use lasers to measure how dirty the air is, and adjust calculations according to those levels. The air around Delta is pretty clean most of the time."

According to Matthews, a charged particle comes from space, hits the earth's atmosphere, and breaks the nuclei of oxygen or nitrogen molecules in Earth's atmosphere. The secondary particles hit other molecules, creating a shower of millions of secondary particles, some of which hit the earth's surface.

The detectors deployed in the desert record the footprints of that shower, which spreads out over a 300-mile radius. The current detectors will be placed closer together than the ones in the past; about 400 yards apart, rather than three quarters of a mile apart.

Detectors are placed near one of the three telescope observatories, which on clear nights detect the glowing, ultraviolet view of the charged particles. The telescopes are very fast and sensitive and can see the showers come down through the atmosphere, but they don't work during the day, when the moon is too bright, or when the sky is cloudy.

The detectors are enclosed in dark boxes, so they can see 24/7, and work even when it's sunny, cloudy or windy. When the two work together it is easier to determine the direction and chemical composition of the particles.

The research center has been able to collect about 100 cosmic rays since beginning of operations in 2008. They hope to increase the area of research over the next few years by placing many more detectors. They are looking at areas northwest of IPSC and others south of Delta by Pahvant Butte.

The cosmic ray project is funded in the United States by the National Science Foundation. Two thirds of the funding for this project comes from the science foundation of Japan, where the University of Tokyo works in close contact with the University of Utah. These two universities lead the world in cosmic ray research since the 1950s. They decided to combine research efforts and data in the late 1990s.

"It is considered basic research, with no immediate application of the data," said Matthews, "It is purely a research project to understand the universe better."

"One of the most important things we have learned is these high energy rays are colliding with the leftover noise of the Big-Bang, and they create new particles, but lose their energy," he said, "We're starting to see signs that we may have discovered the first source of these very high energy cosmic rays. We're seeing a bright spot in the sky that's just a little bit south of the Big Dipper and we're trying to figure out what it is. We need more data to see if it is a source."