Mystical light shows in the skies: the magic behind auroras

by Heather Protz

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Watching the video for Owl Cityâ€™s 2010 hit number, â€˜Vanilla twilightâ€™ on my Time Warner TV- I wa mind blown; it compromised for the present day music videos with such a magnitude of emotion. The awe filled expressions of the cast including little kids and a dog; Shaquille O'Neal (The Shak) with his parting words of â€œtake me with youâ€•; The young couple in the end holding hands and Adam appearing with his grand piano inside a light house in between. I just loved it! But, what impressed me the most was when at the end the sky shows started. Wondering if it was graphics animated with computerized effects I found out that the aurora was actually filmed at a location in Pittsburgh. Not knowing much about auroras or aurorae (plural for aurora), I did some research. Here are some of the interesting facts that I found:

It is named after the Roman goddess Aurora who flies between the skies during twilight and sunrise. Not one of the well known Roman gods, but she is the personification of dawn.

Auroras donâ€™t only occur in the northern magnetic poles. They also frequent in Australia, New Zealand and other parts of the southern hemisphere. The scientific term for northern lights or the aurora effect in the northern hemisphere is â€˜aurora borealisâ€™. In the southern magnetic pole, they are referred to as â€˜aurora australisâ€™.

The earliest sighting of an Aurora was recorded in 1621, when it was given the scientific name by Pierre Gassendi.

When auroras appear they swirl slowly (like how gases move) and change color. This is because all of the magnetic and electrical forces react with one another in constantly shifting combinations. In fact Auroras were known as â€œdance of the spiritsâ€• in the past. They appear in large circles and only around what is called the auroral oval. The color is decided by certain factors based on how auroras work.

Hereâ€™s how an aurora is formed: Solar winds, that is, winds circulating in the sunâ€™s environment cro the earth. These winds are caused by sun spots. Sunspots are dark areas of magnetic disturbance on the surface of the sun. It has been shown that during times of maximum sunspot activity, the sun ejects the greatest concentration of charged particles. And it is during this time of utmost solar activity that auroras are most likely to appear. Solar winds cross the earthâ€™s magnetosphere. The magnetosphere has highly charged varying magnetic and electrical fields. The solar wind follows the magnetic lines of the magnetosphere and tunnels down towards the Earthâ€™s atmosphere. The Earthâ€™ atmosphere presents various gaseous particles that collide with the solar winds. When the particles of the Earthâ€™s uppermost atmosphere collide with these heated winds, energy is exchanged. The gaseous atoms gain energy which is more than what is required. When this excessive energy is emitted, auroras are produced.

Different atoms give off different colors of the spectrum when they are excited. It also depends on where the energy exchange takes place and how far away from the earthâ€™s atmosphere is it happening. The two main gases that interact with the solar wind are oxygen and neon. When the electrons interact with oxygen atoms at a height of about 60 miles away from the Earthâ€™s atmosphere produces a familiar green color. Whereas, oxygen atoms at an altitude of 200 miles away from us give a red color. Ionic Nitrogen produces the blue light up to 150miles and neutral Nitrogen gives off the red-puple and the rippled edges effect above 150 miles

There are many stories about sounds associated with auroras, but there are no recordings of

auroral sounds. Scientists can't agree on what would produce sounds during the aurora.

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Heather is a college student who enjoys writing. As a freelancer she likes to write about easy study mthods, programming and gaming, adventure sports and other things that interest her. She loves to read books, learn about captivatingly old cultures and traditions, listen to rock music and watch scientific programs on her cable TV provided by a Time Warner TV

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