Polar Aurora

1) **What are Polar Aurora** ?



A polar aurora, called aurora borealis in the Northern Hemisphere and aurora australis in the southern hemisphere, is an atmospheric luminous phenomenon characterized by extremely colourful veils in the night sky.

They are often called *northern lights.*

2) **Origin of the Name «** aurora borealis »

The term « dawn of the north » or « aurora borealis » was given by the physicist and astronomer Galileo in 1619.

This name comes from the combination of Roman mythology « Aurora » the goddess of the down and the Greek mythology « Borea », god of the cold north wind . In ancient time, for the Romans, the beautiful goddess Aurora was known to fly through every night sky to announce the coming morning.

3) **Scientific explanation**

Auroras are caused by the interaction between the charged particles of the solar wind and the upper atmosphere. Auroras occur mainly in regions close to magnetic poles, in an annular zone precisely called "auroral zone" (between 65° and 75° latitude).

The energy produced by the sun moves towards its surface and is projected into space in the form of gigantic clouds of burning gas.

Solar particles travel at speeds of up to 8 million kilometres per hour towards the earth 150 million km away.

This energy transported is called solar wind or solar storm.

When particles from the sun reach the earth, they collide with the magnetosphere, the invisible magnetic field around us.

During this collision, the energy contained in the solar particles is transferred to the molecules contained in the aerospheric gas.

In turn, the molecules immediately release this extra energy in the form of billions of flashes of light that give the northern lights.

## 4) The colors :

The colors of the aurora depend on the level of energy contained in the solar particles and the altitude in the atmosphere at which the phenomenon occurs.

### 4.1) Red :

At altitudes of 180 km or more above sea level, the particles come into contact with nitrogen molecules and oxygen atoms. They form a red light.





### 4.2)Green :

Between altitudes of 180 and 120 km, these are oxygen atoms that form a very clear yellow-green light.
It is the most common color that can be observed in the northern areas.

### 4.3)Blue-violet

At altitudes below 120 km, ionised dinitrogen produces blue-violet light.



## 5) Legends of Northern Lights




Northern lights are known for centuries and brought a lot of legends.

In Europ, in the Middle Ages, northern lights were a sign of illness or death.

In the Nordic countries, northern lights were considered to be the souls of the dead returning to earth. Even today, children are told not to shout towards heaven because the spirits could come back to earth and punish or remove them.

Here are some legends according to countries :

1) In France, we can see Northern Lights on 30,000 year old rock paintings.

2) The Greek philosopher and naturalist Aristotle (384-322 BC) described the phenomenon as "powerful, fiery, burning torches, like luminous beams, spears of fire and goats that straddle the sky ».

3) In Germany, some religious leaders have exploited the fear of the northern lights to force people to pay taxes.

4) In Ireland, pregnant women should never look directly at northern lights, otherwise their child will be born with squinting eyes.

5) In Danish folklore, the northern lights were swans that had flown too far north and frozen in the ice.

6) In Norway,
    a. they thought that it was the reflection of huge banks of herring swimming on the surface along the coast. The northern lights were called "lights of herring".
    b. we can see northern lights paintings on the Sami magic drums.

7) In Finland, According to another myth, the phenomenon occurred when big polar foxes dance in the land and threw sparks with their tails.

8) The Inuit in Greenland thought that the auroras were the souls of dead children who played football with the skull of a walrus.

9) The Chukchi, a people living along the Bering Sea in northeastern Siberia, believed that the place of ancestors in the Arctic was determined. Those who died of disease were in the brightest areas, the red flames were the rest of those who had been murdered and the dark areas housed the souls of those who had died crazy.

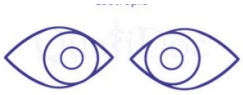
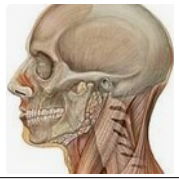
**Conclusion :**

Physical phenomenon or sign from god, Northern lights are an enchantment in the sky.

**Bibliographie :**

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**Glossary**

| Name | Picture | Name | Picture |
|---|---|---|---|
| beams |  | Dawn |  |
| Drum<br>(terre Shaman Drum Saami) |  | fiery | ardent<br> |
| Fox (polar fox) |  | goat |  |
| Herrings |  | spears of fire |  |
| squinting eyes |  | Sparks |  |
| Skull |  | swans |  |
| torche |  | Walrus |  |