Mind

Particles Interacts. Demo.

An aerosol is a collection of fine particles, solid or liquid, of a chemical substance or a mixture of substances, suspended in a gaseous medium.

A cloud is a visible mass initially made up of a large quantity of water droplets (sometimes ice crystals associated with chemical aerosols or minerals) suspended in the atmosphere above the surface of a planet.

The appearance of a cloud depends on its nature, size, the light it receives, as well as the number and distribution of the particles that make it up.

The water droplets in a cloud come from the condensation of water vapor in the air.

The maximum amount of water vapor (invisible gas) that can be contained in an air mass varies with temperature: the hotter the air, the more water vapor it can contain.

The sun was formed from a cloud of stellar matter mainly composed of hydrogen, the most common atomic element in the universe and whose nucleus shrinks to a proton. By contracting under the effect of the attraction due to gravity, this cloud heated up until the nuclear reactions ignited from which the sun derives its energy, part of which radiates in the form of light. and heat.

The nuclear reaction from which the Sun derives its energy is the fusion reaction of two protons into a nucleus of deuterium.

It uses hydrogen as fuel.

This reaction releases about 2 million electronvolts compared to the few electronvolts given off by the combustion of a carbon atom from coal dust or a drop of gasoline.

For the reaction to ignite, protons (hydrogen nuclei) must come into contact, which is only possible at temperatures above a million degrees.

The sun therefore derives its energy from a phenomenon very similar to radioactivity.

The deuterium nucleus resulting from the fusion of two protons is made up of one proton and one neutron.

One of the two protons turned into a neutron.

The transformation of a proton into a neutron involves nuclear forces that create beta radioactivity, which physicists call weak forces.

Without the help of these weak forces, this transformation would be impossible.

Two protons, even in contact, are unable to merge because they repel each other.

However, each of the two protons has the ability to transiently transform into a neutron by emitting a particle called the W boson.

This W boson is generally immediately reabsorbed, the neutron becoming a proton again.

Exceptionally, it happens that the ephemeral W finds time to decay into a positron and a neutrino.

The neutron no longer becomes a proton again. It can then fuse with the other proton to form a deuterium nucleus.

In astronomy, interstellar cloud is the generic name given to the accumulations of gas and dust in our Galaxy.

Noctilucent clouds, also known as polar mesospheric clouds, or, luminous nocturnal clouds, are atmospheric formations of very high altitude.

For a terrestrial observer, they appear as brilliant clouds in the form of filaments or sheets, visible during the deep twilight, that is to say the astronomical twilight.

Most of the time, these clouds are observed during the summer months between latitudes 50 ° and 70 ° north and south of the equator.

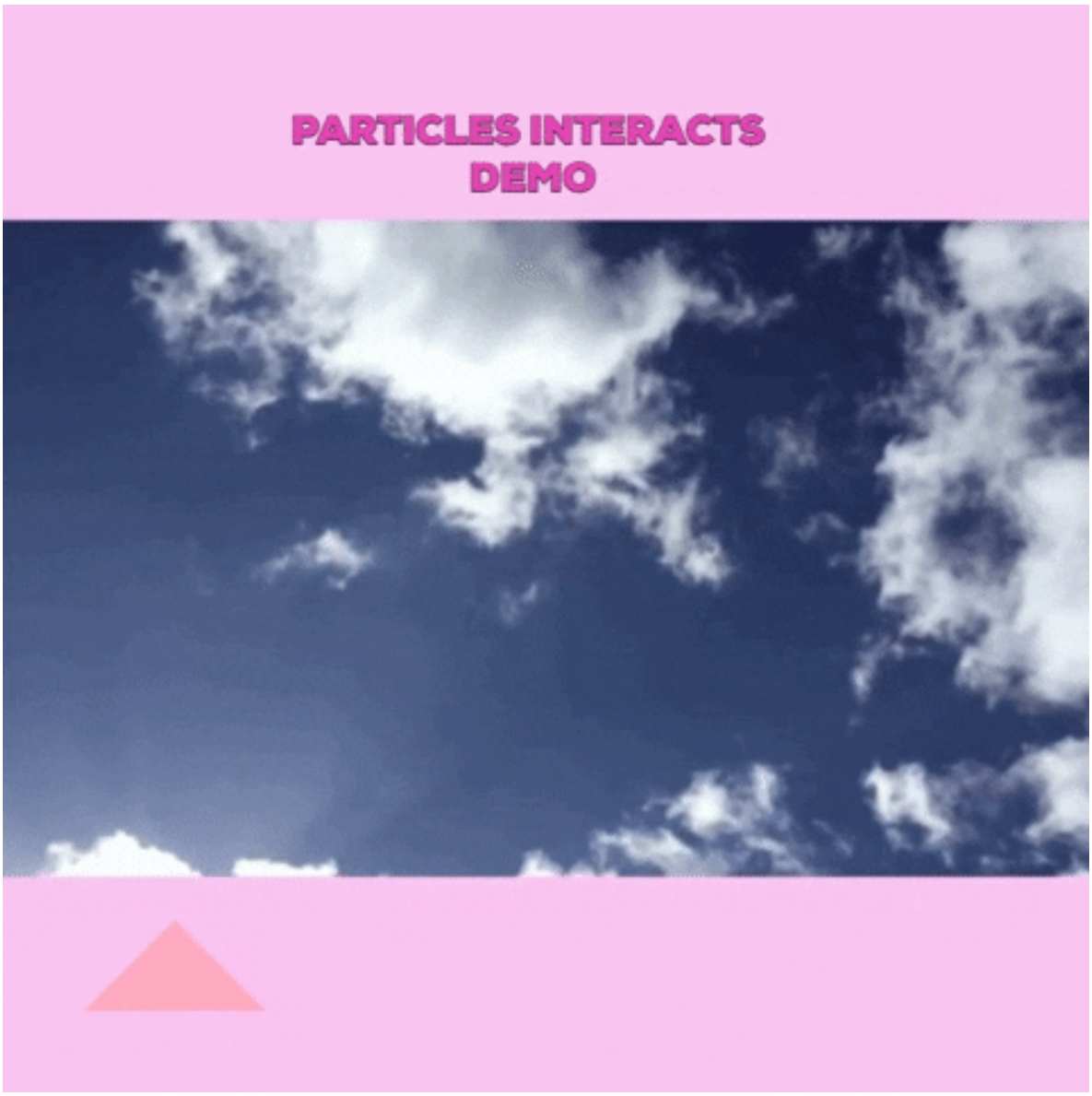
They are between 75 and 90 kilometers above sea level.

It is the environment from which star systems are born.

With a few tens of billions of atoms per cubic meter (as opposed to our atmosphere, which has 25 trillion trillions), and spanning hundreds of light years, it contains the equivalent of several thousand times the mass of the Sun in gaseous matter.

Mainly composed of hydrogen, helium being the second most abundant element, it also contains traces of heavier elements, such as carbon, nitrogen, and iron.

The hydrogen contained in an interstellar cloud can, depending on the density, size and temperature of the cloud, be neutral (HI region), ionized (HII region) or molecular (molecular cloud).



Aesthetic and sacred representation.

The diffusion of light by cloud droplets according to Mie's theory is mainly towards the direction from which the light comes and in the direction in which it goes, it is the luminance of the cloud.

This light comes, for the most part, directly from the illuminating star or from the sky, but an appreciable part can also come from the earth's surface.

Thus, the whiteness of the clouds is maximum when the observer directs his gaze in an axis aligned with the sun, either behind or in front of him.

At any other angle, it only receives a fraction of the brightness.

Naturally, the thickness and density of the cloud (previously mentioned notion of opacity) also comes into play, hence the sometimes extremely dark base of

cumulonimbus clouds.

The dispersion of light through the ice crystals of cirrostratus, for its part, obeys Rayleigh scattering which is isotropic according to the angle but depends on the wavelength.

This is why we often see circular halos around the sun or parhelions (or false suns) when this type of cloud intervenes.

Sky condition is the description of cloudiness, opacity, height and type of cloud, as well as obstructions to visibility such as fog, precipitation or smoke, at a specific time on different floors. cloudy.

The earth's atmosphere is more or less saturated with water. Satellite imagery shows that at any given time, about 60% of the earth's surface is covered with clouds.

Cloudiness, or cloud cover, refers to the fraction of the sky covered by clouds of a certain genus, species, variety, layer, or combination of clouds.

Total cloudiness is the fraction of the sky hidden by all visible clouds.

Both are measured in oktas, one-eighth of the sky, or tenths.

Cloudiness and cloud opacity are reported by meteorological reports (METAR)

Opacity is the vertical visibility through clouds.

Clouds can be thin and transparent like cirrus clouds or block light completely.

Cloudiness and opacity are generally estimated by an observer, sometimes using dark glasses to avoid glare.

However, cloudiness can be calculated by the fraction of the hour that a celometer records clouds.

Pearly clouds are clouds that form in the stratosphere at an altitude between 15,000 and 25,000 meters. Pearly clouds are rare and form especially in winter near the poles.

They were described by astronomer Robert Leslie as early as 1885.

They are involved in the formation of holes in the ozone layer because they support chemical reactions that produce molecules of chlorinated compounds. These molecules act as a catalyst for the reaction destroying ozone molecules.

Ambiguities linked to the mode of cloud formation.

Clouds are formed by two processes: convection and the gradual uplift of the air mass.

Convective uplift is due to the instability of the air.

It is often vigorous and has an abrupt onset.

It produces clouds characterized by high vertical extension, but limited horizontal extension.

These clouds are generically designated by the term "cumulus".

They can develop at different levels of the troposphere, where instability exists.

The so-called synoptic uplift is the result of dynamic processes in a stable atmosphere, in a stratified flow.

This uplift is gradual, producing cloud systems of uniform texture, which can cover thousands of square kilometers.

These clouds are generically designated by the term "stratus"

It sometimes happens that this gradual uplift destabilizes the atmospheric layer, giving rise to convective clouds nested in the stratiform cloud.

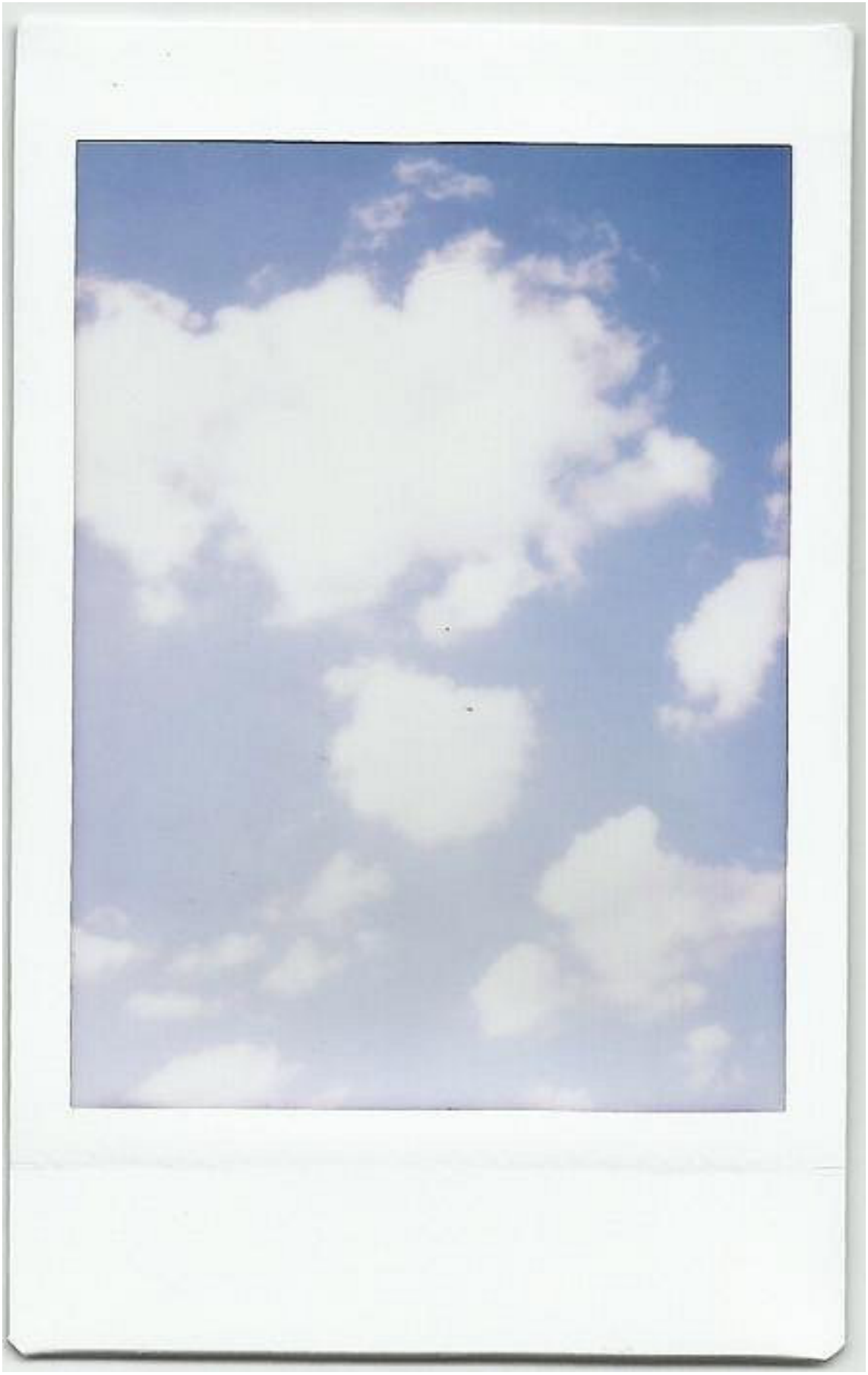
At the end of the Middle Ages, the literature which until then had difficulty in grasping the ephemeral and mobile nature of the cloud, developed this theme which corresponded even more to the inspirations of the following centuries (baroque period and romanticism, in particular the German Sturm und Drang)

Nevertheless, the cloud represented in the arts remains essentially in the domain of the sacred until the nineteenth century (hierophany of the ascension of Christ, mystical visions)

From the nineteenth century and until today, artists like Claude Monet, John Constable or Olafur Eliasson use scientific observations of clouds (especially from balloon ascents) in their works.

As for Charles Baudelaire, he represents the clouds as the quintessence of the life of a stranger in his poem l'Etranger:

"- Who do you like best, enigmatic man?" your father, your mother, your sister or your brother? - I have no father, mother, sister or brother. - Your friends ? - Here you are using a word whose meaning has remained unknown to me to this day. - Your homeland? - I do not know in what latitude it is located. - The beauty ? - I would love her willingly, goddess and immortal. - Gold? - I hate him as you hate God. - Hey! what do you like then, extraordinary stranger? - I like the clouds ... the passing clouds ... over there ... over there ... the wonderful clouds! »



Before the nineteenth century, clouds were therefore above all aesthetic objects.

Scientists try to describe them subjectively but their too diverse, complex nature and their transience hinders their categorization although there have been some attempts to use them in weather forecasts.

Jean-Baptiste de Lamarck proposed in 1802 the first scientific classification of clouds by a list of descriptive terms in French, but it was Luke Howard's system, using the universal Latin of Carl von Linné's binomial classification, which was successful. since its publication in 1803 and whose terminology is still used today.

In 1855, Émilien Renou proposed the addition of the genera Altocumulus and Altostratus.

In September 1896, this expanded version of Howard's original classification was officially adopted and published in the First International Cloud Atlas of 1896.

The current edition published by the World Meteorological Organization dates from 1956 for volume I and 1987 for volume II.

It is this that prevails in the various national meteorological services.

The Earth is not the only celestial body to have an atmosphere where clouds form. In general, most planets and moons in the Solar System with large atmospheres have clouds, but their composition is often very different since their atmosphere is made up of various gases.

So for example, the thick clouds that cover Venus are formed of sulfur dioxide, water vapor and droplets of sulfuric acid, while those of Jupiter and Saturn are made of ammonia on the outside, hydrosulfide ammonium in the middle and water inside.

Clouds also appear to have been detected around extrasolar planets, and it is very likely that most planets in other planetary systems have them if they have an atmosphere, even if planets with "transparent" (cloudless) atmospheres appear to have clouds. also have been detected, including gas giants.

The formation and classification of these extraterrestrial clouds also vary with the composition of the atmosphere considered.

Videos link by click on the title. (The vis is one of 4)

Ask me

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