



Light Effect And Optical Effect That Causes Colors To Be Seen In The Sky And In The Transparent Prism Experiment

Reality of nature

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Abstract: Physicists such as Sir Isaac Newton through the prism experiment, Rayleigh through the gas tube experiment, Tyndall through the scattering of light by particles in a colloidal solution experiment, C.V.Raman through the solution mixed water tube experiment have given explanations that due to the scattering and refraction of the light as it flows through the medium, the colors in the light are seen separately at different wavelengths. But according to this, there is no explanation for the fact that natural blue color in the sky appears to be much more diffused in space above the clouds and the sun, the colors yellow orange red are seen only on the clouds, the green color is not visible and many other information about the colors are not clear.

The scattering and refraction of light described by physicists are some information related to the flow of light. But because the particles in the medium have different densities and the light passing through these particles has different intensities, the transparency translucency and opacity in the particles of the medium are the information about the effect of light. This report provides information on scientific explanations and experimental explanations of prism using black-and-white strips which confirms that the colors are indirectly arising because of the optical effects of white color when light passes through particles of mediums having different densities exposed to light and dark black colors when light intensity is low.

Key words - Light & Dark, Inverse square law of light, Light Medium, Atmosphere Particles, Density of Medium, Intensity of Light, Light Effect, Optical effect, Transparent Prism, Total Internal Reflection/Critical angle, Spectrum, Primary –Secondary color wheel.

I. INTRODUCTION

As sunlight flows through Earth's atmosphere, it also flows through the space causing light effects and optical effects that cause colors to appear in the sky. According to the Inverse square law of light, which is the law of the flow of light, the sunlight spreads around from its source and its intensity decreases as it spreads further, so that the intensity of sunlight exists at that place, and where its intensity is less, after the space is filled with darkness because of there is no intensity of light. So even in the morning when goes beyond the atmosphere, the dark black color is seen in the space. Particles in the form of liquid, gas and dust in the Earth's atmosphere produce transparent, translucent and opaque effects when exposed to sun light. We can see up to the height of the Earth's atmosphere which is a rare medium, and up to the distant region where the sun light is

flowing in the space, having transparency and translucency due to the effect of light, by looking at the region beyond the atmosphere through the white screen that is raised by the sun light on particles in the form of clouds in atmosphere, the darkness in space does not appear directly black to us, but indirectly looks like blue due to the optical effect i.e we see that black color through white colored screen. That is why the blue color is like a vast expanse in the sky.

In the evening as sunlight penetrates a larger area of the atmosphere, shadows are cast on the particles in that area. Thus, looking at the sun through a black screen that is standard placed on transparent, translucent particles in the atmosphere directly in front of the sun causes an optical effect where the white color of the sun appears yellow, orange, red. These same colors reflect due to the effect of light on clouds made up of opaque particles in the atmosphere, which is why yellow orange red colors are seen only on clouds. Even at that time blue color is visible on the surface of the space.

In this way, as the effect of light causes the colors to rise in the sky, the light flowing through different density of the transparent prism is scattered and refracted, and has different intensity also the effect of total internal reflection occurs in the triangular prism, thereby causing the effect of light. As the surrounding atmosphere is darkened at that time, a dark black color appears in the lesser light space inside the prism. Then there is an optical effect between the white color of the light and the black color of the darkness in different amounts and the colors of the spectrum arise.

II. PROPERTIES OF MATERIAL AND METHODS

Light flow is important for seeing colors in the sky and in the transparent prism experiment. The particles of the Earth's atmosphere and the triangular transparent prism which are the medium of light have different densities through which the light passing through has different intensities. This results in transparent, translucent and opaque light effects in the medium. When the intensity of light falling on the particles of the medium is high, the particles have a bright white color and when the intensity of light is low or absent, the particles have a shadow/darkness black color. Thus, the light effect of transparent, translucent and opaque caused by different densities of media particles, the optical effect caused by different intensities of light between the white color of light and the black color of darkness, the objective description and practical information about what we see as different colors in the spectrum are described in this essay.

This description includes information on light medium having different densities, light having different intensities, and the optical effects of light white color and dark black color. Explains the effects of light from sunlight streaming through the sky and space causing the colors seen in the sky and the effects of light inside a transparent prism causing the colors of the spectrum to be seen.

Respectively regarding these information 1) Light and Darkness, 2) Description of white color of light and black color of darkness when light passes through medium, 3) Light effect and optical effect, 4) Color wheel and their combination effect, 5) The sky and space extending to the area where the sunlight is streaming, 6) Spectrum colors appearing indirectly and 7) Prism experiment on white and black stripes like IFT are provided.

2.1 Light and Darkness.

When seeing the colors of the spectrum it is crucial to make sure that light passes through that medium where surrounding area is filled with darkness. The effects of light that occur during that period have roles of both light and darkness involved. So it is important to know about the presence of light and dark.

Light is a wave of electromagnetic energy. The natural source of this light energy for us is the sun and the source of artificial light energy is electric bulb, lamp etc. According to the Inverse Square Law of Light, the

intensity of light decreases as it disperses and travels further from its source. According to the amount of energy possessed by the source of light production, the intensity of the light will flow forward as far as the distance and the area of the responsible for the production of light to the area where the light flows forward. Thus, when the light flows forward, its intensity is very low and once it disperses completely, there is darkness. The light falls on the physical objects in the area where the light is flowing and those objects become visible to us. Then darkness will arise behind the same objects. And, we see things only when there is light. In the absence of the same light, we cannot see things and the place is full of darkness. Light is produced only from a source, whereas darkness is not produced from any source. Whether it is morning or night, when there is no light or when the flow of light is obstructed, darkness is filled everywhere. When light flows, this darkness disappears in that area, and when the same light is absent, and it appears again.

We can also see the darkness that is behind the area covered by light. This is due to the transparent, translucent properties of the medium in the area where the light is passing through. This is how we see the light beyond the darkness. This is due to the transparent, translucent quality of the particles as medium in the dark region.

Handy tip

- Both light and darkness are physical objects.
- Darkness has the opposite quality of light.
- Darkness does not arise from any source and is everywhere. Therefore, when light is emitted from a source in the center of the area surrounded by darkness, the darkness disappears when the light is the brightest and the same darkness appears when the same light is the dullest, in proportion to the intensity of that light.

2.1.1. Description of Sun-light flow :-

Sunlight is responsible for the colors seen in the sky, and it is important to understand the flow of that light is in relation to this.

Sun is about 150 million km away from our earth in space. The intensity of sunlight at its origin in the photosphere region has a temperature of 5777°C and reaches our Earth at a temperature of about 56.7°C .

Sunlight is constantly flowing around the spherical sun like a ball as per the Inverse square law of light.

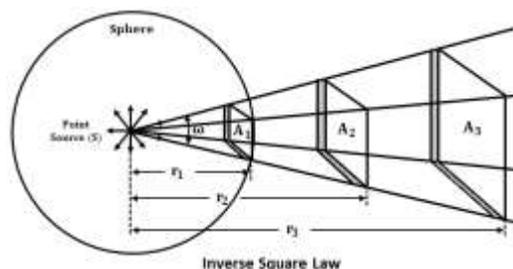
In this way, the sun light's intensity is spread in all direction like a spherical ball but as it flows and reaches the end of the solar system, the impact of this sunlight goes on reducing till it reaches its end.

Thus, we are inside the solar system within this sphere of light around which the sunlight flows.

But the reason for experiencing darkness at night is because the part of the earth where we are is turned in the opposite direction to the flow of sunlight, blocking the flow, then the shadow (Umbra) occurs so we experience darkness. And since the sun's light continues flowing past our Earth, we can see things even in the darkness of deep space, even though the intensity of the light is less at night.



Sun light streaming



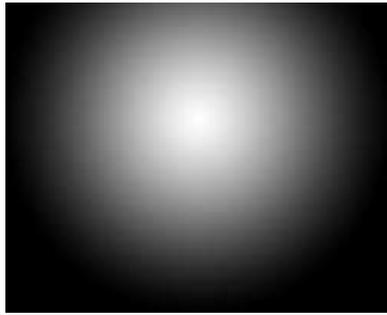
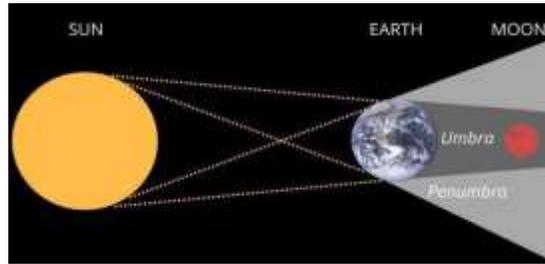


Image of sphere of sun light



Umbra - shadow of sunlight

Handy tip

- Sunlight is constantly flowing.
- As the sunlight is flowing towards the earth, it is flowing beyond/away from the sun, and because of the intensity of light, we are seeing that area above/beyond the sun.

2.1.2 Nature of Darkness.

The colors of the spectrum arise because of the effect of light caused by both the white color of light and the black color of darkness. It is important to know the nature of existence of this absence of light which is blackness is a physical entity that is not produced by any source.

Although we are inside a sphere of continuous sunlight, we experience darkness at night because the part of the Earth we are on is turned in the opposite direction to the flow of sunlight, blocking the flow of light.

It is because of the obstruction to the flow of light that we experience darkness even in the morning. Due to this, the shadow that appears in the morning is also a lesser form of darkness.

Just as we see blue color in the sky above us in the morning, we see black color in space when we are beyond the Earth's atmosphere. This was reported by Apollo astronauts while on the moon. And also in the photos taken by the satellite about the formations of black color beyond the atmosphere. According to the Inverse square law of light, darkness cannot exist when sunlight is flowing around and when the place is filled with light rays. However, the blackness seen beyond the atmosphere is the blackness of the dark region where the intensity of sunlight in space is not present or reachable. Because the medium in which the light is passing through has a transparent, translucent quality, it is possible to see the dark area behind the light filled area. Accordingly, since the particles in the Earth's atmospheric region have a transparent, translucent property and the vacuum region outside space has a transparent property, even if there is a ray of light where the sunlight is shining, the blackness of the darkness beyond them can be seen.

Whether it is morning or night, we are always under the impact of light as the sunlight flowing from its source is spread around us according to the law of Inverse Square Law of Light. But there is complete darkness after a phase in space where the intensity of sunlight is reduced and completely absent. The darkness in that place has nothing to do with light and there is no source for producing this darkness. Darkness does not arise from any source; it is filled in the atmosphere region and the vacuum region where there is no atmosphere. When there is light, when its intensity is high, darkness is not visible to us, when the amount of light intensity is low; the presence of darkness is visible. When there is complete absence of light there is complete darkness. As a result, light is uniformly saturated in the area of this medium through which the light flows, and when there is no light; darkness covers the place everywhere in this medium. In the morning, the darkness arises as shadow in the shape of the object that lies directly across the path of the light. Although it is recognized as a shadow, it is a shadow of darkness that fill/pervades everywhere. This shade, which is proportional to the degree of light blocking, is also dark with a standard black color.



Dark black appear above the sun Moon.



Earth viewing from above the atmosphere.



Apollo astronaut on the Moon.

Handy tip

- Because darkness is not produced from any source and is spread everywhere, we do not see the presence of darkness when light flows, just as we see the presence of darkness when there is no light and when it is obstructed.
- A bright white color appears on the part of an opaque object on which the light falls, and a dark black color appears behind it and back of the same object.



- Blackness appears in space when we go beyond the atmosphere during morning. Where there is a ray of sunlight streaming into space, there is no dark black color. But the sun's light flows according to the Inverse square law of light and after its resolution decreases further, the black color of the darkness that fills the space is seen when we goes beyond the atmosphere.
- When we put our hand across the flow of light, we see its shadow appear on the wall. But even if there is darkness in the empty space between our hand and the shadow appears, we cannot see it. This darkness is not visible. This is due to the fact that the media particles in that area are transparent. Through the medium of transparency, the area of greater light beyond is visible. But since the wall on which the shadow of the hand is raised is an opaque material, we cannot see further through it, and the percentage of darkness in that place is seen by us as black. Similarly, in the evening time, as the shadow of darkness covers the particles of the atmosphere, black color of darkness is rising in the area of the place which cannot be recognized by the eye.



Shadow cast by the hand across

- An image of an object that is in a region of complete darkness cannot be formed by our eyes. Similarly, if the intensity of light is maximum, the image of the object at that place where the light falls does not arise in our eyes. Therefore, the percentage of light and darkness is important to create an image of an object in our eyes. In this way, as our eyes work like a mirror, we are able to identify objects according to the percentage of light and darkness.

2.2. Description of white color of light and black color of darkness when light passes through medium :-

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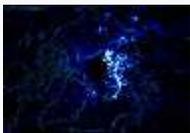
2.2.1 Profile of light Medium :-

When light flows through any physical objects, those objects act as a medium. They can be in the form of liquid, solid and gas. Depending on the density of those medium, they are transparent when the object is thin, translucent when slightly dense, and opaque when dense.

2.2.2 Details of the atmospheric particles which is the medium for light :-

The atmosphere surrounding the earth is made up of water particles, dust particles and gas particles; it surrounds the Earth from ground level to an altitude of about 1000 km. Light from the sun passes through this atmosphere. Thus the medium of light is transparent, translucent and opaque according to the density of the particles present in that region of the atmosphere. This causes light to have varying degrees of intensity and refraction as it passes through these atmospheric particles. Thus the particles reflect as glowing brilliant white when light falls on them. But, particles that do not receive light rays are covered in darkness and appear black or grey. And in the area where less amount of light falls, the particles there will appear black in the right amount.

The role of water particles in the atmosphere is important in creating transparent, translucent and opaque light effect as a medium in the Earth's atmosphere. These water particles are dispersed from ground level up to high in the atmosphere as clouds of various levels and forms. These clouds in the atmosphere are divided step by step and the details are below :

Form Level	Stratiform non-convective	Altitude	Appearance	
Extreme-level	PMC: Noctilucent veils	75,000 to 85,000 m (250,000 to 280,000 ft)	 Polar Mesospheric Clouds	 Noctilucent clouds
Very high-level	Nitric acid & water PSC	15,000–25,000 m (49,000–82,000 ft)	Glowing brightly with vivid <u>iridescent</u> colors	 Polar stratospheric cloud
High-level	Cirrostratus	6,000 - 13,000 m (20,000 - 43,000 ft)	white veil	 Cirrostratus cloud

Mid-level	Altostratus	2,000–7,000 m (7,000–23,000 ft)	Sheet or layer, can usually see the sun through it	 Altostratus cloud
Towering vertical				 Altostratus undulatus
Multi-level or moderate vertical	Nimbostratus	500-5,500 m (2,000-18,000 ft)	Dark, widespread, formless layer	 Nimbostratus cloud
Low-level	Stratus	0-2,000 m (0-7,000 ft)	horizontal layers	 Stratus cloud
Surface-level	Fog or mist			 

As the clouds at different levels are thin and dense and have different densities, the light passing through them creating the effect of transparency, translucency and opacity.

Handy tip :

- When light falls on the particles in the form of clouds, these particles glow brilliant white. When looking at the dark black that is beyond the atmosphere through a screen of transparent translucent particles filled with glowing whiteness, the light effect and optical effect of transparent translucent light causes the blackness which beyond the atmosphere to appear to us as very diffused blue sky.

2.3. Descriptions of different densities of light mediums :-

2.3.1 Details of atmospheric particles having different densities :-

Earth's atmosphere is full of water, gas and dust particles. As sunlight flows through this atmosphere, it is a medium in which the particles become thinner and denser and have different densities. Particles in the atmosphere are transparent when thin, translucent when slightly dense and opaque when fully dense.

Water particles in the atmosphere are generally more dispersed than other particles, ranging from thin to dense. Because water particles are thin and dense in the form of clouds, these clouds act as a medium when sunlight shines through them, creating transparent, translucent and opaque light effects.

Handy tip

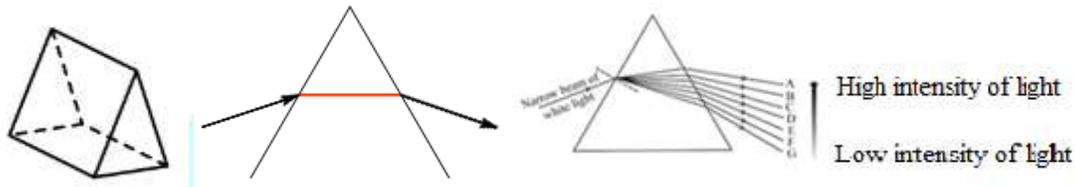
- We can see the sun and moon in space when the atmospheric particles are transparent.

The sun and moon in space appear obscured when atmospheric particles are scattered translucently. Nothing in space can be seen by us when atmospheric particles are diffused opaquely.

- If there was no atmosphere on Earth, the black color in space that is present beyond the atmosphere would be visible to us directly from Earth. But because we are seeing this black color through the transparent, translucent screen of atmospheric particles, due to the effect of light, we are indirectly seeing that black color in blue color.

2.3.2. Details of the triangle transparent prism having different densities:-

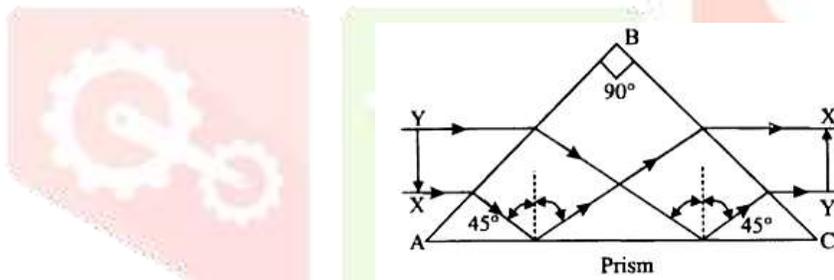
Since the prism is triangular in shape, the distance between its two inclined faces is different while referring from the tip of the prism down to its base, according to this having different densities. Light passing through such different densities the intensity of light is different. That way, even when a single light beam passes through a prism, it is refracted at different angles and travels through different areas, so the same light will have different intensity levels.



Different density of triangular shape of transparent prism and different intensity of light flowing through prism.

Handy tip

- Total internal reflection of light occurs due to its triangular shape when light passes inside the prism. Thus, when subjected to total internal reflection, light will flow at different intensities due to different densities and angles of the prism. This results in the optical effect of seeing one color through the opposite walls of the mirror-like prism while flowing into lines of light composed of varying amounts of white and black.



Total internal reflection

- This causes spectral colors to appear inside the prism as a result of light effect, just as black can be seen while viewing through a white screen and white through a black screen. These same colors combine with the light coming out of the prism to form the colors of the spectrum on the screen in front of it.

2.4. Details of the light effect and optical effect :-

3.1. Physical objects are transparent, translucent and opaque based on its property to allow flow of light through them. A light effect occurs when light passes through such transparent, translucent, opaque materials. Because of this, as light passes through transparent objects, objects become fully visible. When light passes through a translucent material, objects seen through that material appears obscured. And since light cannot pass through an opaque material, any objects cannot be seen through that material. But opaque shiny materials such as mirrors create reflections.

In this way, the medium through which light passes through causes the effect of light, such that the atmosphere is a rare medium and a transparent prism is dense medium. This means that more area or distance is required to

produce any effects by the transparent, translucent opaque light effect through the atmosphere as it is a rare medium, but these effects might be seen with less surface area in a prism as it is of denser transparent medium. The same light effects such as the atmosphere is produced in a smaller area through a transparent prism.

2.4.1. Transparent, Translucent and Opaque Lighting effects.

When viewing different objects through transparent and translucent objects, their color affects the colors of other objects that are viewed through them, and the original color of other objects appears different through these transparent and translucent objects.

When seeing another object through a red-tinted glass, the color of the other object appears changed. But actually the color of that other object does not change physically. Like the light effect, when seeing the color of another object through the red colored transparent object, an optical effect occurs and the original color appears as a different color. Similarly when seeing the same colored other object through different colors with transparent objects and translucent objects, the same color of other object appears as a different color due to optical effect.

Thus the black color in outer space is seen through the particles of the atmosphere which are white color in the morning as a transparent or translucent screen; therefore the black color appears as blue. And when we look at the white color of the sun in outer space through the Earth's atmospheric particles that gives black shadow as the transparent or translucent screen in the evening, the white color of the sun appears as yellow, orange, red due to optical effect.

Light cannot pass through opaque materials, but mirror, dense water particles and other opaque objects with shiny properties create reflections which cause those shiny sparkly properties. Similarly, in the opaque clouds rising at different levels of the atmosphere in the evening, the yellow orange red colors seen because of the sun in the parts of the clouds directly exposed to sunlight are reflected and seen only on those clouds.

Handy tip

- When looking through a transparent, translucent object with white color or black color, another material with color appears in a different color/shade due to optics effect. This is due to the fact that **white and black colors are optically effective colors**.
- The optical effect when viewing another object through a transparent, translucent material containing certain colors causes the color of the other object to appear a different color. This is the result of the colors appearing in proportion when two colors are combination with respect to colors. This can be known from the color wheel. E.g.:- when looking at a yellow object through a red colored transparent object, yellow object appears orange in color but its color wouldn't have changed in real. Similarly, when looking at a yellow object through a blue transparent object, the other object appears green in color.
- The sun and moon appears white in color during morning, because we see Sun and Moon through the white screen of the atmosphere particles, and the color of Sun and Moon appears white, therefore white color don't show any effect on objects that are also white in color as light effect. But in the evening/night the Sun and Moon appears in yellow, orange and red color because we see the Sun and Moon at that time through black color screen of the atmosphere particles. The light effect can be seen during that time.



Morning Sun



Evening sun

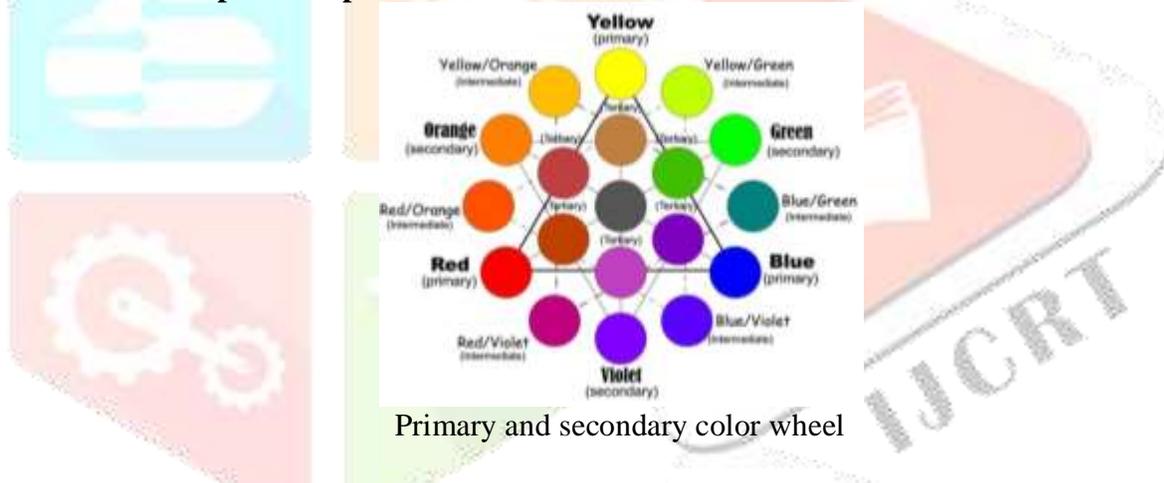


Morning Moon



Night Moon

2.5. Color wheel description of spectral colors and their combination effects :-



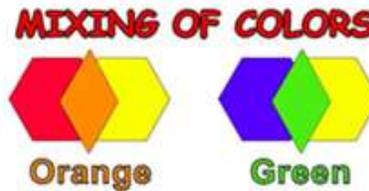
The compositional details that account for the various colors seen in the sky and the flow of light in the prism experiment can often be understood through the combination of colors used in painting. Both methods are natural color combination patterns.

2.5.1. Details of Primary and secondary colors give information about the order of colors and the color produced when adjacent colors are combined. In the same way, the colors in the primary color wheel are the colors that appear in the order of the spectrum. The colors of the spectrum as called 'VIBGYOR' they are the colors on the primary color wheel.

2.5.2. Adjacent colors on the primary color wheel are combined together to produce colors on the secondary color wheel. Accordingly, if the adjacent colors of any one color in the spectrum are combined, the resultant color will be the middle color. In this way, we see the green color in the spectrum and in the rainbow due to the combination of colors that are emerging next to each other. But in the sky there is no combination of colors in this way, so green color is not visible. The other colors seen in the sky are caused by the optical effects of white color of light and black color of the darkness.



Adjacent colors are combined



Combination of two colors.



There is no combination of colors in the sky

2.5.3. About primary colors, these colors have different proportions, combination of two colors is described by Sir Isaac Newton in his book on optics.

Handy tip

- A different color is formed when two primary colors are combined. Similarly, in Prism's experiment and in the colors of the rainbow spectrum in the sky, when two adjacent colors are combined, the color in the middle of those two is formed.
- Green appears in the spectral colors in the prism experiment and in the rainbow. But when looking at the sky, in the morning there are different amounts of blue color, in the evening yellow, orange and red colors are visible, but there is no green color. The law of color combination makes it clear that the colors of the spectrum seen during the prism experiment and the rainbow are close to each other and blend together, resulting in green color from the combination of yellow and blue colors in the spectrum. Similarly, from the colors seen in the sky, any two colors do not combined with each other and arise separately, so there is no combination of yellow and blue colors and therefore green color does not form. This makes it clear that the colors seen in the spectrum and in the sky are due to the other two colors i.e white color of light and black color of darkness due to optical effect.
- In the sky, white color of light and black color of darkness are affected by light effect, resulting in the optical effect of seeing colors. Although light has different intensities when it flowing in different percentage / ratios, if there is no black, then the light will only pass as white. Even when a halo appears in the sky in the morning, since the sunlight is falling directly on the atmosphere, the black color does not appear in the atmospheric

particles at that place, so that there is no optical effect between the white color and the black color, and the halo appears in different intensities of white color without spectrum colors.

2.6. The details of the sky and space extending to the area where the sunlight is streaming :-

2.6.1. Sunlight flows through the Earth's atmosphere as well as through the vacuum region beyond the atmosphere. The atmosphere is from about 1000 km high up to ground level of the Earth. The region so far is the Earth-centered sky and the region beyond is outer space. The region of outer space is infinite. But the sunlight has enough light intensity to reach only the area to consider the solar system in outer space. Darkness fills the region of space beyond which the intensity of sunlight has ceased.

2.6.2. The sky is space from the ground level of the Earth up to the upper part of the atmosphere. A region filled with atmospheric particles is followed by a region empty with vacuum. The light flowing in the earth's atmosphere comes from the sun in outer space and according to the Inverse square law of light, the light is flowing around the sun. When sunlight passes through particles in the atmosphere it creates a transparent, translucent, opaque light effect that is important for us to see colors in the sky. Similarly, since we see sunlight streaming into space which is before the atmosphere, the effect of darkness in space after the intensity of sunlight is also important to the colors we see.

2.6.3. Just as there are physical objects in outer space such as the Sun, Moon, and stars, there is also empty space. This empty region can be measured in terms of area to determine its **Mass**, just as other physical objects, such as stars, planets, measure their area to determine their affinity. Accordingly, in the Dark Matter of astronomy, this empty region is considered as physical matter existing in the physical world. In the description of dark matter, it says that 96% mass of the entire universe is made up of empty space and only 4% mass of the universe is actually made up of planets, stars and other celestial bodies. Similarly, the mass of empty space in the area of the solar system is also greater than the total mass of planetary constellations like Sun, Earth, Moon.

2.6.4. Sunlight flows according to Inverse square law of light. Depending on the intensity of that light, it flows through the atmosphere of the Earth as well as through the vacuum in space. Hence, just as the region of the atmosphere through which light is flowing is a medium of light, the vacuum region of space is also a medium of light. Therefore, the light is spread even in the vacuum region up to the area where the intensity of the light is ending. And when there is no light there is darkness in the region of outer space. In this way the intensity of sunlight in outer space, the area affected by the light is the distance up to the flowing distance. Accordingly, the region of atmosphere filled with liquid, gas, dust particles is the rare medium and the region of outer space that is vacuum is the rarest medium. From this, considering the effect of light in the atmosphere, and the effect of light in outer space beyond the atmosphere are related to the colors we see in the sky.

2.6.5. Sunlight falling on the atmospheric particles and scattering and the atmospheric particles being the medium of light having transparent translucent and opaque properties are responsible for the colors seen in the sky. But the sunlight is not only flowing towards the Earth but is also flowing around it according to the Inverse Square law of light, in this way the light is also flowing on the other side of the sun. Thus the law of light is that when the intensity of the light flowing around the sun in space diminishes and ends, there is darkness in outer space.

Handy tip

- According to the Inverse square law of light, since light flows around the Sun, we are not only seeing up to the height of the Sun. We are also seeing a distant area where the light is streaming behind that Sun.
- The black color we see when we are beyond the atmosphere is the black color of the darkness that exists after the intensity of sunlight in space cannot reach.

- When we know the darkness that exists after the intensity of the sun's light is gone, we become acquainted with true darkness.
- A prism is a dense medium through which light can pass, an atmosphere is a rare medium, and a vacuum is the rarest medium.
- In terms of mass, the area of empty space in the universe is greater than the area of other physical matter in dark matter. This makes empty space more important in the physical world. Since this is everywhere, the empty space around us is spread endlessly in outer space.

2.7. Details of the colors seen in the Prism experiment, in the sky and in the rainbow are indirectly appearing colors :-

The blue, yellow, orange, red colors that we see in the sky are not directly produced colors but indirectly produced by the effect of light and optical effect. When we look at an object in front of us through another transparent or opaque object, the object appears blurred due to the effect of transparent and translucent light effect on the object and the difference in its color is seen. Thus seeing through a different object causes the object in front to be seen differently due to the effect of light and optical effect. In this way the blue, yellow, orange, red colors in the sky are not directly evoked colors but indirectly evoked by the effect of the law of transparent translucent and opaque light effect and the optical effect between white color of light and black color of darkness.

Handy tip

- When we look at the physical objects in front of us through a transparent translucent material, the effect of light causes the physical object in front of us to appear different in shape and color than its original. This means viewing the things in front of us indirectly.

2.8. Details of Prism experiment carried out on effect of light produced by white and black colors causing spectrum colors :-

An experiment was carried out in which strips of white and black color were viewed through a prism to prove experimentally that the colors of the spectrum are seen due to the effect of light and optical effect produced by white and black colors.

In this experiment, the same rules followed while seeing the sun during evening through the medium of atmospheric particles is applied which we see the colors in the sky naturally, we are looking through the Earth's atmosphere which is the medium for light during this, and the sun which is the source of light is also visible. Accordingly when this experiment of viewing the source of light through a medium of transparent prism was carried out, also when the black color was surrounding the white color of the light source, the colors of the spectrum appeared, so there were experiments conducted based on these.

The details of the experimental data obtained from these are as follows.

2.9. Details of Prism Experiment which proves that white and black colors creates spectral colors when exposed to light effect :-

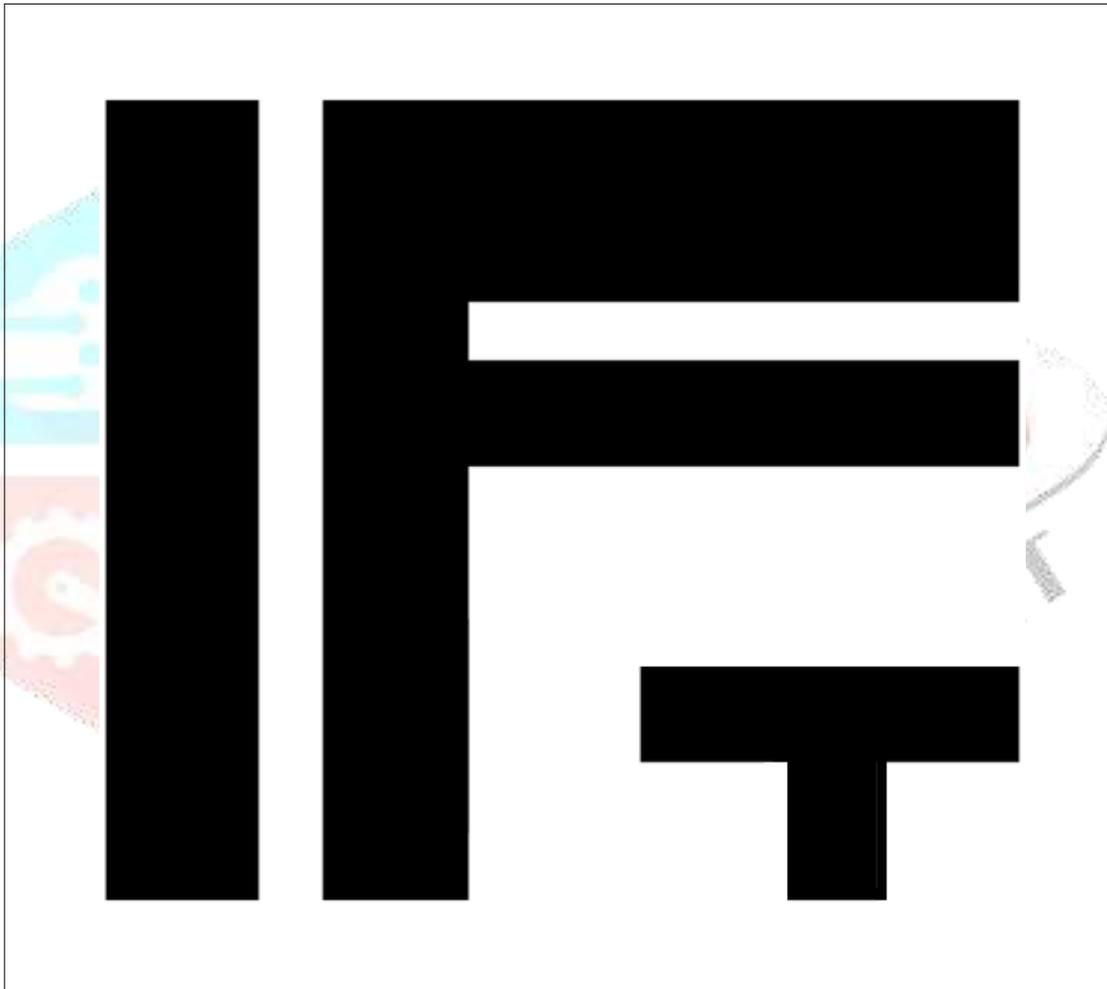
In the IFT model strips with white color and black color were drawn on a sheet and used for the prism experiment.

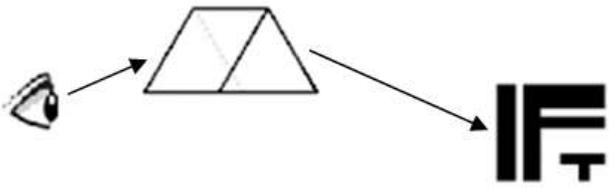
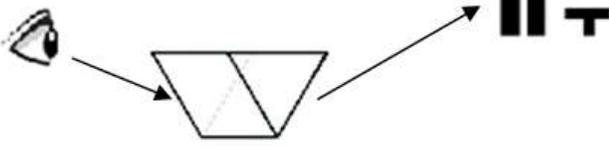
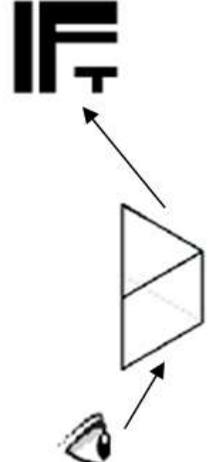
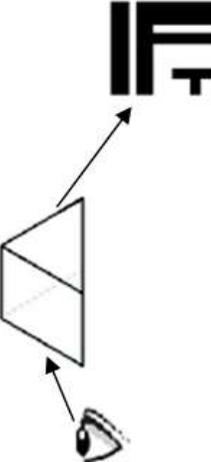
It has horizontal and vertical stripes, and the distance between the two white stripes and the distance between the two black stripes are adjusted to be close and far apart.

When looking at these stripes of white and black stripes through a prism, the colors of the spectrum of VIBGYOR rise up at the edges of the stripes.

As the colors of the spectrum arise due to the different affinity of the medium and the different intensities of the light passing through it, horizontally and vertically drawn white and black stripes were experimentally verified by rotating a transparent prism of different affinity in different directions.

IFT – (Internal Face Transaction) experiment with White and Black stripes :-



Sl No	Face of prism	Colors appearing at the edges of IFT
1	<p>Upward</p> 	
2	<p>Downward</p> 	
3	<p>Rightward</p> 	
4	<p>Leftward</p> 	

Details of prism experiment :-

VIBGYOR's spectral colors appear at the edges of the horizontal stripes when viewed while holding the prism upwards during the experiment. Also, the colors of the spectrum are reversed like ROYGBIV at the edges of the horizontal stripes when viewed while holding the prism downwards.

Similarly, the colors of the spectrum of VIBGYOR appear at the edges of the vertical stripes when viewed while holding the prism towards the right. Also, the colors of the spectrum are reversed like ROYGBIV at the edges of the vertical stripes when viewed while holding the prism towards the left.

But when looking at the stripes while holding the prism upward or downward, the colors of the spectrum appear only at the edges of the horizontal stripes and not in the vertical stripes. Also, when looking at the stripes by holding the prism towards the right or the left, the colors of the spectrum appear only at the edges of the vertical stripes and not at the horizontal stripes. From this it becomes clear that when the colors of the spectrum are seen, different combinations of white and black colors and transparent prism produce the effect of light.

When viewed through a transparent prism, when the gap between the two white or black color stripes is far apart, the color VIB – YOR at the edge of the stripes appears as a discrete bunch in which no green is visible.

But where the distance between the two stripes is close, the colors of the full spectrum of VIBGYOR can be seen. At that place blue and yellow are two colors that are close together and green color is between those two colors. From this it is clear that the colors of the spectrum are formed by the combination of two colors and the rule of combination of colors is that which color is formed by the combination of two different colors. And mixture of the yellow and blue color combination makes green color.

Handy tip

- It is important that the light flows in the experiment of prism. In an IFT experiment with black and white stripes, light does not shine directly, instead, when an object is visible to our eyes, the light falling on that object has the effect of flowing directly into our eyes. It is under the impact of this light that the colors of the spectrum appear indirectly at the edges of the stripes when looking at the black and white stripes in the IFT experiment through a prism.
- Depending on the density of the medium, the light passing through it will have different intensities. Thus, the use of IFT confirms that the colors of the spectrum are indirectly seen by us due to the effect of light and optical effect between the white color of light and the black color of darkness.

The yellow and blue color combination makes green color in the prism experiment and rainbow. But there is no green appear in the sky because the yellow and blue color cannot be combined together, because the two colors of yellow and blue appear in different places in the sky.

III. HISTORY.**3.1. A brief description of the information given by Sir Isaac Newton about the colors of the spectrum :-**

3.1.1. Sir Isaac Newton in his book Optics published in 1704 mentioned various effects when light passes through a transparent prism. Similarly, when light passes through the prism, the colors of the spectrum are seen.

3.1.2. Sir Isaac Newton informed in his book Optics about colors are compounded by high refractile rays and less refractile rays of light, yellow and blue are compounded to appear green.

3.1.3. If a white object surrounded by black or darkness is viewed through a prism, colors arise at the edges. And if a black object is covered with a white color, the visible colors appear in the opposite order when viewed through a prism.

3.2 A brief description of the information given by Ray-Leigh about the colors of the spectrum :-

3.2.1. Ray-Leigh in 1894 stated that the colors of the spectrum have different wavelengths, in that way, when we see colors in the sky, we see blue color in the sky because the blue color has the shortest wavelength among the colors in the form of waves due to the scattering of light caused by the sunlight falling on the particles of the atmosphere, in the evening time in the horizon lane is said to have a red color with a longer wavelength due to sunlight streaming through the atmosphere which has more area.

3.3 A brief description of the information given by Tyndall about the colors of the spectrum :-

3.3.1. In an experiment conducted by Tyndall in 1859 by colloidal solution and passing a bright light through, a blue color and a red color appeared at the end, it is said that blue and red colors appear in the sky due to light falling on the particles of the atmosphere and scattering.

3.4 Details given by C.V.Raman about the colors of the spectrum :-

3.4.1. C.V.Raman conducted an experiment in 1928 to check the appearance of blue color in sea water, in this experiment, when a bright light was shined on one side of a tube filled with water mixed with solution, a blue color appeared in the water in the tube and a red color appeared on the particles at the end, in the same way, Rayleigh said that when light falls on the particles and scatters, blue color is seen in sea water and sky according to the wavelength of the colors in the light.

Handy tip

- 1) In the information given by the Physicists, there is no experimental information about the effects of the trigonal prism having different densities that cause the spectral colors to be produced in the prism experiment and the light flowing through the different densities having different intensity levels, and there is no information about the effects of light that causes the production of colors. But their information only tells about the way of the light is flowing.
- 2) In the experiments carried out by the physicists on the appearance of blue color, gas and saluted water was used as the medium. These are densely particles and opaque. Other objects cannot be seen through this opaque medium. Therefore, it is not possible to see the source material of light through the gas and saluted water particles used in experiments by physicists. But we see the sun, the source of light, through the Earth's atmosphere, which is a natural medium, and at that time, the particles of the atmosphere are transparent and translucent. This reveals that the physicists' explanation of the experiment is full of misinformation.



Saluted water experiment

- 3) Although Newton mentioned about seeing the colors of the spectrum when black color is surrounded by white color and white color is surrounded by black color, he did not explain about the effects that caused it. But the next physical scientists like Rayleigh, Tyndall and others divided the colors appearing in the spectrum into wavelengths and said that the colors are seen in the sky accordingly. **It simply describes the way light flows.** But different density of medium and different intensity of light are important factors in causing the effect of light from white color of light and black color of darkness to produce colors and **these factors are not checked.**
- 4) Darkness that is deep inside the sea water where there is no light/obstruction, the white color that arises when light shines in that place and the blue color appears as the result of an optical effect when there is different density depending on the area from the pre-saturated black colors, and the color seen in the sky is reflected due to the reflection of light rays on the distant ocean water. This is due to the effect of light and optical effect caused by the different intensities of the white color of light and the black color of darkness that makes the sea water appear blue and other colors.



Blue color in the Sea water

- 5) When examining the issues related to the colors seen in the sky and in the prism experiment, it is found that there are many differences between the explanations given by the physicists and the real factors also the scientists have not given any explanation for some of the real factors. The details are as below.

- 5.1) The blue color seen in the sky is very diffused in the sky and the yellow orange and red colors are only in some part of the clouds. In the report, it is explained that the place where the blue color appears is higher than the sun and the place where the yellow orange red color appears is the place with clouds. But in the description of physicists, the scattering of sunlight when it falls on the particles of the atmosphere tells us that the colors in that scatted light are visible to us, according to which the position in the sky where the colors are seen is at the height of the atmosphere and does not give any information about the difference in the actual positions. Due to this, there is a difference between the explanation given in this report and the explanation given by physicists.



Viewing from the ground



Viewing from above the cloud

- 5.2) The green color visible in the spectrum but not in the sky. There is no information in the physicists explanation about the absence of green color in the sky. But this report states that the blue and yellow colors do not combine in the sky because the colors produced by the effect of light in the sky are separate, so that the green color does not appear in the sky.
- 5.3) Looking at the position where the colors are visible, the position where the blue color is visible beyond the sun and the yellow, orange and red colors are only visible on the clouds high in the atmosphere. Regarding this, the dark black color which is in the last position beyond the sun in outer space is seen as blue color due to the effect of light and the white color of the sun is seen as yellow orange red color due to the effect of light and is seen on the clouds due to reflection so that the position where the color like blue is seen and the position where the yellow orange red colors are seen are different in the report. There is no information in the physicists explanation about the differences in positions.
- 5.4) The yellow, orange and red colors that arise in the evening are seen in the light beam that is flowing intensely between the clouds, but when the blue color appears in the morning, the blue color never appears in the light beam flowing intensely between the clouds, so the light beam remains white in color. **This confirms the report that if there are colors in the middle when light flows, those colors will flow with the light and that the blue color appears beyond the sun.** In this way, there is no information in the explanation of physicists about the difference in colors seen in light beam.
- 5.5) During the prism experiment the environment surrounding in the room is made dark and only when a beam of light is passed through the prism do the colors of the spectrum arise, but if the surrounding there is fully illuminated, the colors of the spectrum do not arise in this prism experiment. From this, it is clear that the effect of light and optical effect caused by the white color of light and black color of darkness is the cause of the colors of the spectrum as stated in this report. But there is no information about this in the explanation of physicists.

- 5.6) In the morning the sky is blue while the sun appears white in the evening the sky is yellow orange red while the sun appears yellow orange red. This report states that the transparent translucent light effects are responsible for this. But there is no information about this in the explanation of scientists.
 - 5.7) In the morning, if we are out of the atmosphere we see dark black color in space. At the same time of the morning we can see the sun and the moon if we look from inside the atmosphere of the earth, but we do not see this black color. This report states that the black color seen in space appears as blue to us due to the light effect of transparent and translucent and optical effect. But there is no information about this in the explanation of the scientists.
 - 5.8) The blue color we see in the sky when viewed from Earth is behind the clouds. Also, when it is beyond the atmosphere (from the top of the moon, from a satellite, looking towards the earth in the opposite direction, it can be seen that there is a blue color on the earth after the clouds. At the same time, the ground of the earth is covered with black color. This clarifies the fact that black appears blue to us because we see black through a white screen due to the light effect of transparent, translucent. But there is no information about this in the explanation of the scientist.
6. When I was young, I used to go to the village with my father in the car and when I was coming back in the evening, I would see the white sun through the window glass of the car with tinted sticker, and the sun would change to yellow or orange. This reminds me of the surprising phenomenon of changing colors while looking at white from a black screen.

IV. CONCLUSION.

The light effects and optical effects caused by the flow of light cause different colors to appear in the sky and in the prism experiment, the details of the physical factors related to this are as follows :

Different density of medium and different intensity of light :

- 1) Liquid, gas and dust particles in the atmosphere, which is a rare medium, are transparent, translucent and opaque at different densities, and light passing through such particles has different intensities.
- 2) A transparent prism of a dense medium is triangular in shape so that the distance between its two sides varies in density from tip to base, allowing light passing through it to have different intensities, and refracted light undergoing total internal reflection (critical angle).

Method of flow of light :

According to the inverse square law of light, the sunlight continuously flows around the Earth's atmosphere and space, when light falls on the particles of the atmosphere, the particles glow white, when the intensity of light is less and when there is no light, the particles are covered with shadow/darkness and turn black.

Similarly, in space too, the region with the intensity of sunlight is filled with light, and the latter region is filled with darkness. Therefore, when someone has gone beyond the Earth's atmosphere in the morning, the region of upper space appears black. During the prism experiment, when the atmosphere is darkened and the light is

passed through the prism, the light has different intensity and the place where the light intensity is less inside the prism is filled with darkness.

Light and optical effects that cause colors appearing :

As explained above, light passing through different densities of media will have different intensities, resulting in the light effect of transparent translucent and opaque. Based on the light that flows through the particles of such a medium, the bright white color and the dark black color are covered. Thus, when looking through a screen of transparent translucent particles covered with a bright white color, dark black coated particles have the optical effect of making black itself appears blue, and when looking through transparent, translucent particles covered with dark black color, the optical effect is white appears yellow, orange or red.

Similarly, the dark region filled with sunlight beyond the atmosphere is seen through a screen of glowing white particles raised by light passing through the Earth's atmosphere, causing the optical effect of black to appear blue, and seeing the white color of the sun through a screen of black colored particles due to the darkness of the shadow covering the particles of the atmosphere in the evening, the white color appear yellow, orange or red. In this way, the yellow, orange, red color seen indirectly by the sun due to the optical effect on cloud particles in the evening time atmosphere is reflected by the effect of light.

Light refracts inside a transparent prism and flows at different intensities and is subjected to total internal reflection (critical angle) so white color of light and black color of darkness are subject to the optical effect and the colors of the spectrum that rising indirectly inside the prism flow out of the prism with the light and appear on the screen in front.

In prism's experiment, the colors that appear in the rainbow are together, and green is seen in it. But the colors appear in the sky are separate and green color is not seen in the sky. Therefore, in the prism experiment and in the rainbow, due to the combination of colors, green appears in the spectrum, and in the sky, due to the lack of combination of colors, green is not visible.

The explanations of this report confirm that colors are seen indirectly in the sky and in the transparent prism experiment, where the medium has different densities and the light passing through it has different intensities, resulting in the light effect of transparent translucent opaque.

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