

# Light in science and Christian Orthodoxy

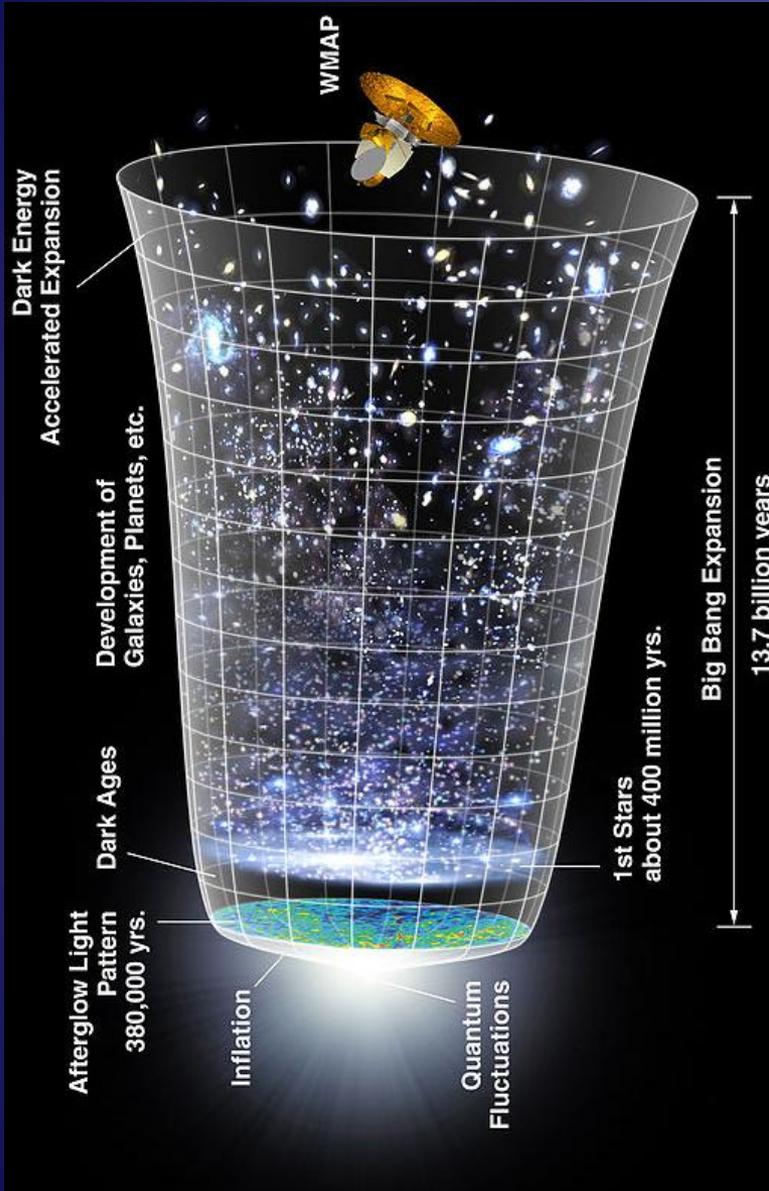
G.J. Gounaris



- The first part of this talk concerns the **ordinary light** we know in science.

- The second part concerns the **Light** of **an other World**.

Even today, there exist people who see this Light. They usually hide in order to protect themselves from any superiority feeling. I will only tell you what the Bible and the Church tradition say.



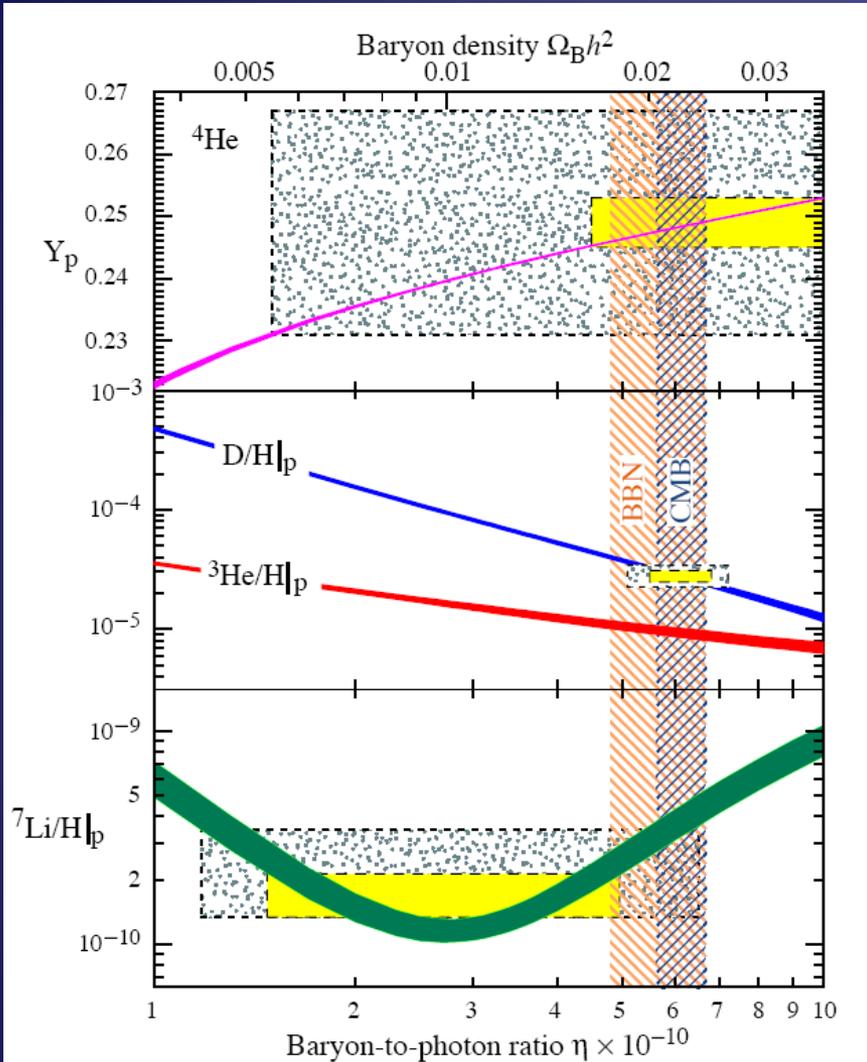
The **oldest** observable we see in our Universe is **space** and **time**.

They were both created about **13.8 billion years ago**.

Initially space was expanding **vigorously**.

Later, till about 5 billion years ago, the expansion was decelerating.

Since then, space expansion is **accelerating again**.



The **second oldest** observable in our Uni are the abundances of the light elements,  $\text{D}$ ,  $^3\text{He}$ ,  $^4\text{He}$ , and  $^7\text{Li}$ , synthesized at the end of the first few minutes.

They are in good overall agreement with the primordial abundances inferred from the standard hot Big-Bang cosmology.



Before continuing with hot Big Bang, we turn to the Bible ...

## Genesis 1: The first day

In the **beginning** God created the **heavens** and the **earth**. And the earth was **formless** and **invisible** and **darkness** covered the face of the deep. And the Spirit of God swept over the **waters**.

And God said, '**Let there be light**'; and there was light.

And God saw that the light was good; and God separated the light from the darkness. And God called the light Day, and the darkness he called Night.

**And there was evening and there was morning, the first day.**

Remember that the Bible description is **anthropocentric**.

earth=matter

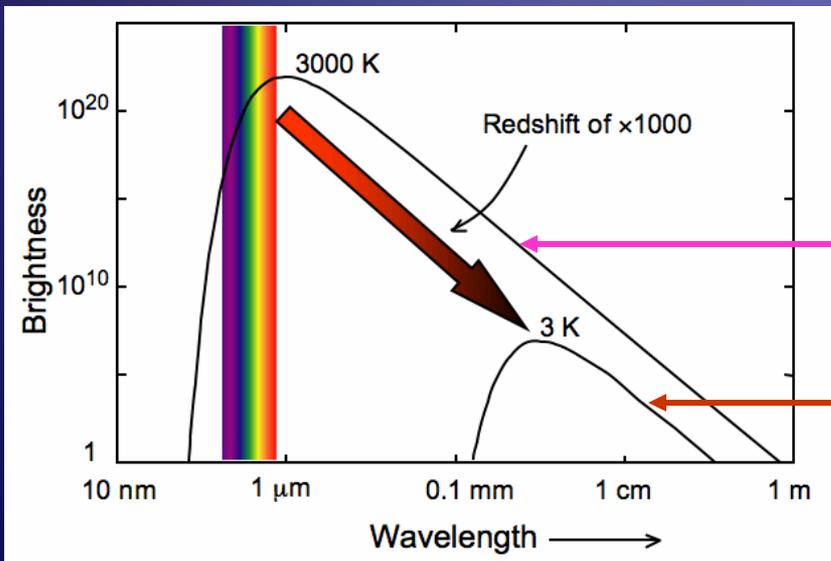
space=heavens



The **third oldest** thing observed is the **light** emitted **~380000 years** after BB.

Before this time, the temperature was very high and the Uni **opaque**. At **~380000 years**, the temperature fall at  $\sim 3000$   $^{\circ}\text{K}$ , allowing the light nuclei to **bind the electrons** and create neutral atoms.

Then, more or less suddenly, Uni became **transparent** and **overwhelmed** by a primordial light. If humans existed at that time, they would had seen a **dazzling white light coming from all directions**, with almost the same brightness.



then

Now

As space was expanding, the wavelengths of this primordial light were growing similarly. Today they constitute CMB .



- Light's spectrum is always determined by the black body radiation theory.
- Its present wavelengths are much above the visible region.
- Its present intensity (brightness) is a factor  $\sim 10^{12}$  smaller than the initial one.
- It still comes with almost the same intensity, from all directions. As it is has been doing for  $\sim 13.8$  billion years ...
- **Penzias and Wilson discovered the remnants of this primordial light in 1964.** They saw the oldest light ever!
- Next I will describe the BB results using the Bible's vocabulary.



## Let there be light.

- The initial light conditions look like those of a July midday here in Crete, where everything around is hot and shining.  
**The first Day didn't have a morning!**
  - As time was passing by, the Light brightness was going down, and its color was becoming more and more reddish, till it passed in the infrared region, and the first Night began.  
Uni was about **20 million years old** at that time ...
  - **The first Day ended through a spectacular evening.**
- And there was evening and there was morning, the first day**
- The Bible and BB descriptions for the first Day-period fit!



- During the first Night, most galaxies were started. And finally, **~9 billion years after BB**, the primitive Earth appeared.
- The following five Days in the Bible account **should be considered as long time-intervals**. They mostly concern earthy events, as would have been seen by an earthy observer. They don't have a day-night structure.
- During these Days the plants and animals were created on the Earth. And finally, the **triune God forms the human being in His image and endows him by His breath of life** (Genesis 2); This is the basic human characteristic.



*light*



*chlorophyll*

*Another impressive role of light is  
Photosynthesis in the plants .*

*It is chlorophyll that makes forests green.*

**Up to now, we have talked about the  
light in the material Universe of science.**



Now I turn to the **Light** of the other World.

In the Orthodox theology, **the value of a man or woman is immeasurable**. Because of **the priceless God's breathe of life, they have been endowed with**.

So, when the human being had lost his way, **the Son of God had to come to help him**, completely ignoring any of his guilt ... Including the smallness of his home planet also...

In doing this, He disregarded the powerful and arrogant and rich. And He turned to the poor and humble.

He told them:

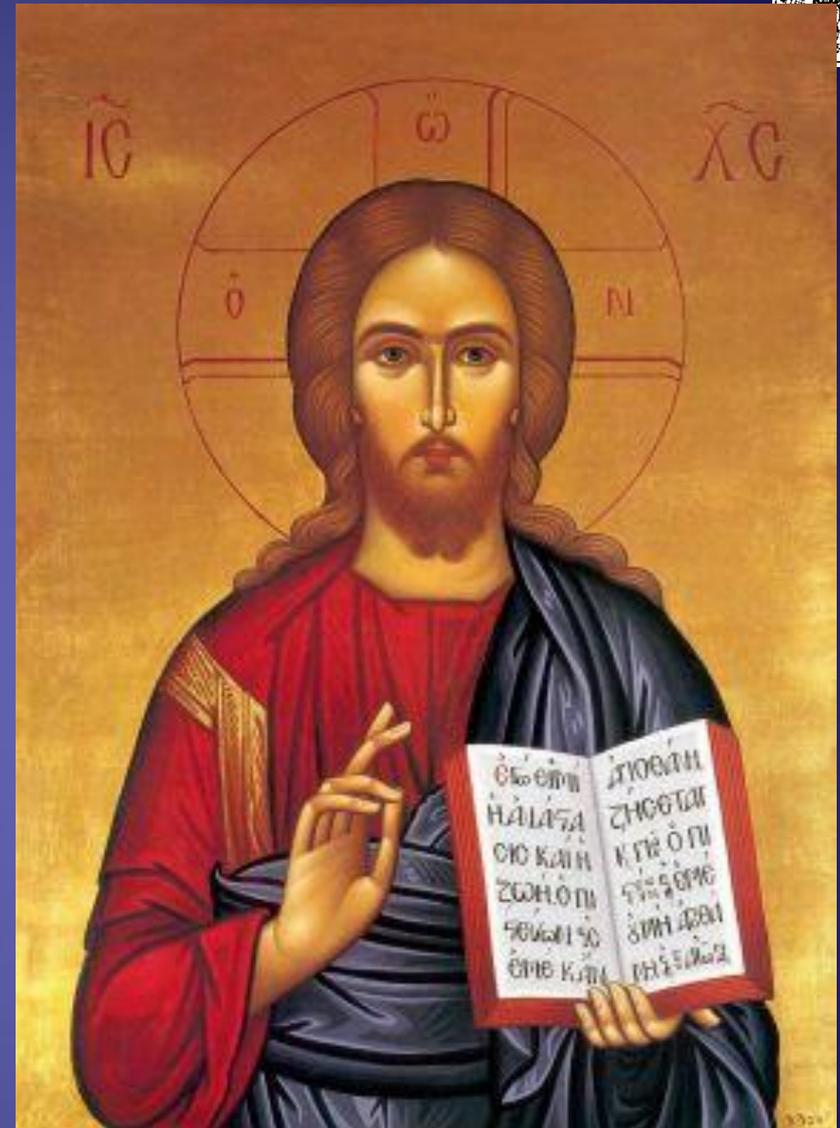
I am the **light** of the world (John 8).

The **true light**, which enlightens everyone ... (John 1).

God is **light**, and in him there is no darkness at all (1John 1).

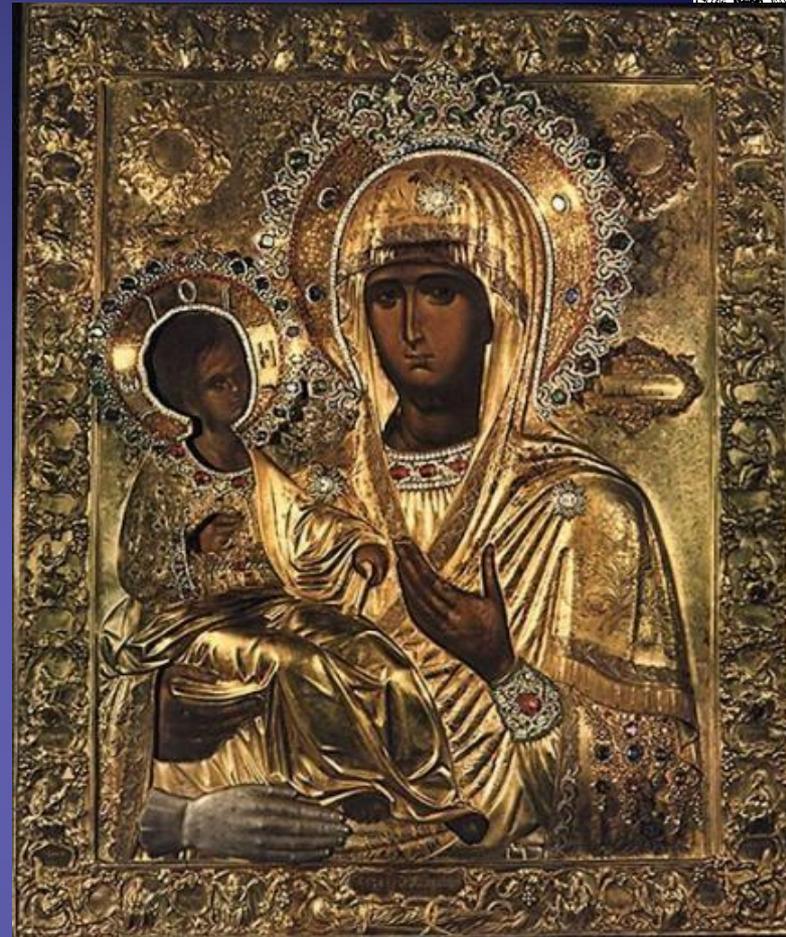
He alone has immortality and dwells in **unapproachable light** (1Timothy 6).

... **clothed with honour and majesty**, wrapped in light as with a garment. (Psalm 104)



And the morning prayer:

O Christ, the **True Light**,  
Who **enlightens** and **sanctifies** every  
man that cometh into the world:  
Let **the Light of Thy** countenance be  
signed upon us, that in it  
we may see the **unapproachable Light**,  
and guide our steps in the doing of Thy  
commandments, through the  
**intercessions of Thy most pure Mother**,  
and of all Thy saints.



Examples of **Light** instances.

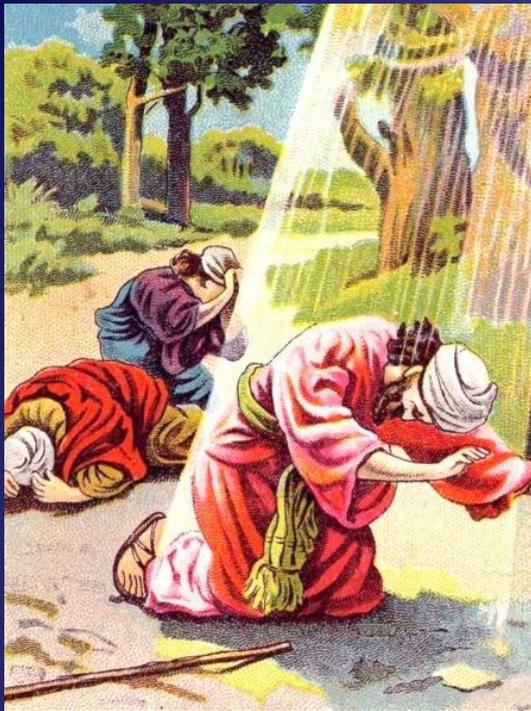
**Transfiguration:** About 40 days before His crucifixion, Jesus tried to prepare His disciples by opening their eyes, so that they see, **as much as they could bear,** His **divine Light**.



*And he was transfigured before them, and **his face shone like the sun, and his clothes became dazzling white.***

*And a bright cloud overshadowed them, and from it a voice said, 'This is my beloved Son; listen to him! ...*

*They were overcome by fear... And when they looked up, they saw no one except Jesus alone ( Matthew 17) .*



Paul in front  
of Agrippa

I was travelling to **Damascus** with the authority of the chief priests, when **at midday** along the road, I saw **a light from heaven**, brighter than the sun, shining around me and my companions.

When we had **all fallen to the ground**, I heard a voice saying to me in the Hebrew language, “**Saul, Saul, why are you persecuting me? It hurts you to kick against the goads.**” I asked, “**Who are you, Lord?**”

The Lord answered, “**I am Jesus whom you are persecuting**” (Acts 26)...

After many years and many such visions Paul realized: **Christ Jesus came into the world to save sinners—of whom I am the foremost** (1 Timothy 1).

Seeing His light should be a source of humility, not of a feeling of superiority.

Something from the Old Testament:

As Moses (~1300 bC) was coming down from Sinai carrying the tablets, he did not know **that the skin of his face was shining**, because he had been talking with God.

But the Israelites were seeing it ... and were afraid to come near him.  
(Exodus 34)



This is repeated since then ... and as we are reflecting the glory of the Lord, we are being transformed into similar images, with an always increasing degree of glory (2Cor 3).

When His light falls on me, I also shine!



The continuously repeated event concerning  
**the Holy Light of Christ's Resurrection:**

This always occurs on the Saturday before the Orthodox Easter in Jerusalem, when the patriarch goes to Christ's tomb to receive the Holy Light, that he would then offer to everyone he wants to light up his Easter candle.

After the Patriarch enters the tomb and his candles are lighted up, the Light also appears like fireballs traversing the space in front of the tomb and directly lighting up the candles of the people it chooses. A description of it may be found in

<http://users.otenet.gr/~styliant/orthodoxia/Holylight.htm>

written by Archimandrite Rev. Antonios Sylianakis M.D.



## We will see Him as He is

The **Light** we talk about is **Jesus Christ** himself.

Do I love Him? Am I ready to deny myself for Him?

1. Those who have my commandments and keep them, are the ones who love me; and those who love me, will be loved by my Father, and **I will love them and reveal myself to them** (John 14).
2. Blessed are the **pure in heart**, for **they shall see God** (Matthew 5).
3. We are God's children now; but it has not yet been revealed what we will become.  
What we do know is that when it is revealed, we will **be like Him**, for **we will see Him as He is** (1John 3).

**I next have passages from three persons  
who have lived under His Light**

**St. Gregory Palamas** (1296-1359) asserts us that:

**Vision of God**, is not simply symbolic,  
nor sensory or created, but it is true **deification**.

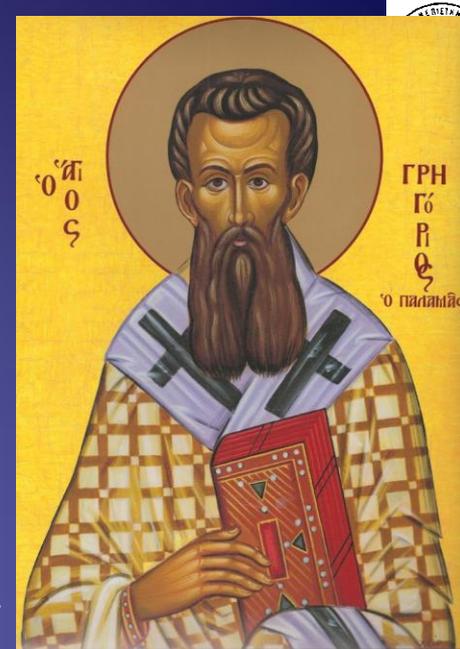
Through **deification** a man is deemed worthy of seeing God.

**Deification** is not an abstract state, but the  
**union of a human being with God**.

This is the aim where Christ wishes to lead us!

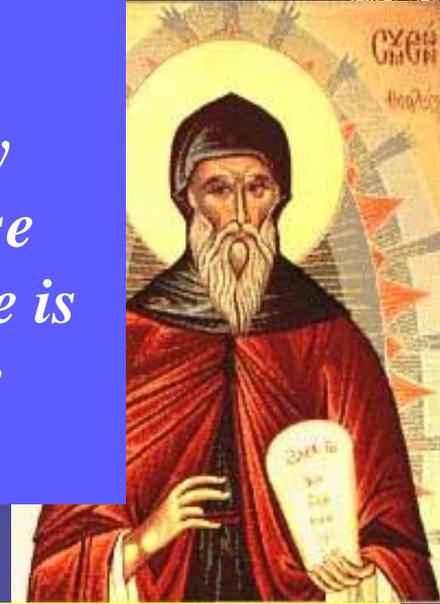
This was also St. Gregory continuous prayer:

**Holy Virgin enlighten my darkness.**



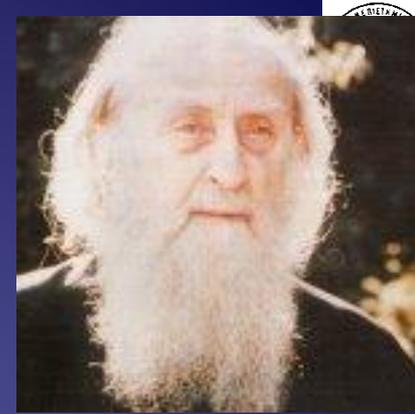
## St. Symeon, the New Theologian (949-1022)

*When men Search for God with their bodily eyes, they can find him nowhere, for he is invisible. But for those who ponder in the Spirit, he is present everywhere. He is in all, yet beyond all. Salvation is near those who fear him, but far away from sinful men.*



**He Himself is discovered within me, resplendent inside my wretched heart, enlightening me from all sides with His immortal splendor, shining on all of my members with His rays. He embraces me entirely, the unworthy one, and I am filled with His love and beauty. I am sated with pleasure and Divine tenderness. I share in the Light. I participate also in the glory. My face shines like that of my beloved and all my members become bearers of Light.**

**Fr. Sophrony of Mount Athos and Essex (1896-1993):**



*This Light penetrates us with the power of God.*

*We become 'without beginning'—*

*not through our origin, but by the gift of Grace:*

*life without beginning is communicated to us.*

*And there is no limit to the outpouring of the Father's love:*

*man becomes identical to God—*

*the same by content, not by primordial Self –Being.*

*God will eternally be GOD for the human being."*

*(We Shall See Him as He Is, p172.)*

Fr. Sophrony recalls that at his early Light-experiences, during his prayers, he didn't dare to look at the Light!  
Any superiority feeling in him, would force it to disappear!



**Conclusion :** the closer a human being approaches the **Light**, the more he realizes **his impotency to achieve his salvation without Christ's grace**. Our deification only comes as a gift from Him!

I finish with a sentence from Revelation:

And I saw the new Jerusalem, coming down from heaven...

Its citizens need no lamp or light ...  
**for the Lord God will be their Light.**

