NOVA SMER RAZISKOVANJA TEMNE SNOVI

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Temna snov je domnevna vrsta snovi v vesolju. Da temna snov obstaja sklepamo na osnovi njenih vplivov na vidno snov. Menimo, da čudna gibanja zvezd lahko pojasni obstoj temne snovi.

Temne snovi neposredno ne zaznamo. Ne vidimo je, niti je ne zaznajo merilni instrumenti. Razkritje nam skrite temne snovi zato predstavlja enega od večjih odprtih vprašanj v sodobni astrofiziki. Astrofiziki vlagajo velike napore v pojasnitev temne snovi.

Kadar raziskovanja dolgo ne dajejo primernih rezultatov, se je smiselno vprašati, ali raziskujemo v pravi smeri, ali morda nismo v slepi ulici.

Izberimo pravi instrument

Poiščimo torej primeren merilni instrument, s katerim bomo merili svetlobo iz vesolja za potrebe raziskavanja terne snovi. Instrument naj bo občutljiv na valovno dolžino svetlobe, ne sme pa biti občutljiv na frekvenco svetlobe

Morda se nam pogoj za izbiro instrumenta zdi odvečen glede na to, da je valovna dolžina svetlobe odvisna od frekvence svetlobe. Morda pa se ravno v takih na prvi pogled čudnih zahtevah skriva pot do razkritja temne snovi

Michelson in Morley sta leta 1887 merila hitrost svetlobe. Izmerila sta, da eter, ki bi lahko vplival na hitrost svetlobe, ne obstaja. Njun instrument pa je ravno pravšnji, med še nekaterimi, tudi za odkrivanje temne snovi.

Michelsonov interferometer

Slika prikazuje shemo Michelsonovega interferometra. Polprepustno ogledalo (BS) žarek razdeli v dva žarka (1) in (2), ki po različno dolgih poteh potujeta do zaslona.

A NEW DIRECTION OF DARK MATTER RESEARCH

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Dark matter is a hypothesized type of matter in the universe. We conclude that dark matter exists based on its effects on visible matter. We believe that the strange motions of stars can explain the existence of dark matter.

Dark matter is not directly detectable. We cannot see it, nor can it be detected by measuring instruments. The revelation of hidden dark matter therefore represents one of the important open questions in modern astrophysics. Astrophysicists are making great efforts to explain dark matter.

When research does not give suitable results for a long time, it makes sense to ask whether we are researching in the right direction, or maybe we are not at a dead end.

Let's choose the right instrument

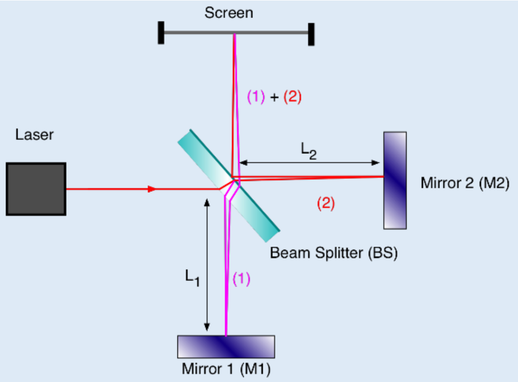
Let's find a suitable measuring instrument for measuring light from space for the study of frictional matter. The instrument should be sensitive to the wavelength of light, but should not be sensitive to the frequency of light.

Perhaps the condition for choosing the instrument seems superfluous, given that the wavelength of light depends on the frequency of light. But perhaps the path to the discovery of dark matter is hidden in such, at first glance, strange requirements.

Michelson and Morley measured the speed of light in 1887. They measured that the ether, which could influence the speed of light, does not exist. Their instrument is just right, among some others, also for detecting dark matter.

Michelson interferometer

The figure is a schematic representation of the Michelson interferometer. The semitransparent mirror (BS) splits the beam into two beams (1) and (2), which travel to the screen along paths of different lengths.



Za potrebe te meritve naj bosta poti žarkov različni L_1<>L_2. Ob različnih dolžinah poti žarkov vsaka sprememba valovne dolžine svetlobe spremeni interferenčno sliko na zaslonu. Njun interferometer je občutljiv na valovno dolžino svetlobe.

Vzorec svetlobnih valov žarkov med ogledali je odvisen le od valovne dolžine svetlobe, ne pa od frekvence, zato njun interferometer ni občutljiv na frekvenco svetlobe.

Hitrosti vira svetlobe ne vpliva na valovno dolžino svetlobe

Njun instrument usmerimo proti gibajočemu viru svetlobe. Opazimo, da instrument ne zazna gibanja vira svetlobe.

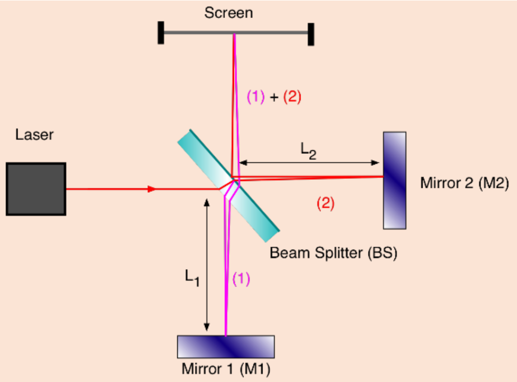
Njun instrument torej ne zazna, da bi hitrosti vira svetlobe vplivala na valovno dolžino svetlobe. Spoznamo, da hitrost vira svetlobe ne vpliva na valovno dolžino svetlobe.

Tak rezultat meritve je v nasprotju s poznano fizikalno doktrino, ki pravi, da hitrost vira svetlobe po Dopplerjevem zakonu vpliva na valovno dolžino svetlobe.

Znajdemo se v dilemi čemu verjeti, rezultatom meritve ali fizikalni doktrini.

Od hitrosti vira svetlobe neodvisna valovna dolžina svetlobe je v znanosti spregledana, čeprav je očitna glede na meritev. V Dodatku je nekaj meritev, ki potrjujejo, da hitrost vira svetlobe ne vpliva na valovno dolžino svetlobe.

Michelsonov interferometer ne zazna sprememb valovne dolžine svetlobe, ker se le-ta pač ne spreminja. Sprememb frekvence svetlobe pa ne zazna, ker instrument ni občutljiv na frekvenco svetlobe.



For the purposes of this measurement, the beam paths should be different L_1<>L_2. With different beam path lengths, each change in the wavelength of the light changes the interference image on the screen. Their interferometer is sensitive to the wavelength of light.

The light wave pattern of the beams between the mirrors depends only on the wavelength of the light, not the frequency, so their interferometer is not sensitive to the frequency of the light.

The speed of the light source does not affect the wavelength of the light

We direct their instrument towards the moving light source. We notice that the instrument does not detect the movement of the light source.

Their instrument therefore does not detect that the speed of the light source affects the wavelength of the light. We realize that the speed of the light source does not affect the wavelength of light.

Such a measurement result contradicts the well-known physical doctrine, which states that the speed of the light source affects the wavelength of light according to the Doppler law.

We find ourselves in a dilemma as to what to believe, the results of a measurement or a physical doctrine.

The wavelength of light, which is independent of the speed of the light source, is overlooked in science, although it is obvious from the measurement. There are some measurements in the Appendix that confirm that the speed of the light source does not affect the wavelength of the light.

The Michelson interferometer does not detect changes in the wavelength of light because it does not change. However, it does not detect changes in the frequency of light because instrument is not sensitive to the frequency of light.

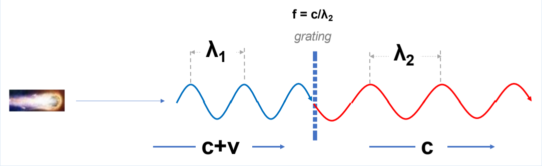
Nabor možnih merilnih instrumentov

Za merjenje valovne dolžine svetlobe poleg Michelsonovega interferometra lahko uporabimo Fabry–Pérot interferometer ali optično prizmo vendar pod pogoji, da na poti merjene svetlobe ni nobene mrežice. Teleskopi imajo včasih vgrajeno mrežico za opazovanje usmerjenosti teleskopa. V tej meritvi za merjenje valovne dolžine svetlobe ne sme biti niti te niti kakšne druge mrežice.

V tej meritvi nastopa mrežica s prav posebno funkcijo, opisano v nadaljevanju.

Meritev frekvence svetlobe

Svetlobo, ki ji merimo frekvenco, vodimo skozi gosto mrežico - uklonsko mrežico.



Kadar svetloba prihaja z gibajočega vira svetlobe, pred mrežico izmerimo drugačno valovno dolžino svetlobe, kot za mrežico. Valovno dolžino merimo z enim od predhodno opisanim merilnikom. Na mrežici se valovna dolžina svetlobe spremeni.

Drugače je, kadar svetloba prehaja skozi steklo. Pred steklom izmerimo enako valovno dolžino, kot za steklom.

Svetloba z gibajočega vira svetlobe prispe s hitrostjo, ki se razlikuje od konstante c. Mrežica povrne svetlobi hitrost na vrednost, kot jo določa konstanta c.

Hitrost svetlobe za mrežico je merljiva in jo določa konstanta c. Merimo jo po merilnih metodah za merjenje hitrosti svetlobe med mirujočo mrežico in mirujočim ponorom.

Za mrežico znana hitrost svetlobe c in izmerjena valovna dolžina λ_2 omogočata merjenje frekvence svetlobe **f = c/λ_2**.

Luknja v meritvah

V fiziki se frekvence svetlobe ne meri. Obstaja celo prepričanje, da frekvenca svetlobe ni merljiva.

Tudi ob tej jasni razlagi, kako meriti frekvenco svetlobe, obstajajo dvomi glede meritve.

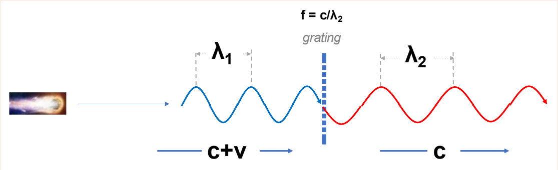
A set of possible measuring instruments

To measure the wavelength of light, in addition to the Michelson interferometer, we can also use a Fabry–Pérot interferometer or an optical prism, but under the condition that there is no grid in the path of the measured light. Telescopes often have a built-in grid for observing the telescope's orientation. Neither this nor any other grid should be present in this measurement for measuring the wavelength of light.

In this measurement, a grid with a special function, described below, appears.

Measurement of the frequency of light

The light, the frequency of which is measured, is guided through a dense grating - a diffraction grating.



When light comes from a moving light source, a different wavelength of light is measured in front of the grid than behind the grid. The wavelength is measured with one of the previously described instruments. The wavelength of light changes on the grid.

It is different when light passes through glass. We measure the same wavelength in front of the glass as behind the glass.

Light from a moving light source arrives at a speed that differs from the constant c. The grating restores the speed of light to a value determined by the constant c.

The speed of light behind the grating is measurable and is determined by the constant c. It is measured using measurement methods for measuring the speed of light between a stationary grid and a stationary sink.

Behind the grating, the known speed of light c and the measured wavelength λ_2 enable the measurement of the frequency of light f = c/λ_2.

A hole in the measurements

In physics, the frequency of light is not measured. There is even a belief that the frequency of light is not measurable.

Even with this clear explanation of how to measure the frequency of light, there are doubts about the

Meritev je izvedljiva s standardno astronomsko merilno opremo.

Merjenje hitrosti svetlobe

Frekvenca svetlobe pred mrežico je enaka izmerjeni frekvenci svetlobe za mrežico.

Pred mrežico lahko izmerimo valovno dolžino svetlobe λ_1. Hitrost svetlobe pred mrežico je enaka zmnožku izmerjene frekvence in valovne dolžine svetlobe pred uklonsko mrežico **λ_1**. Vpadna hitrost svetlobe je (c+v) = **f.λ_1**.

Vpliv gravitacije na lastnosti svetlobe

Pri raziskovanju temne snovi je pomembno, da poznavamo vpliv gravitacije na lastnosti svetlobe. Na osnovi poznavanja kroženja zvezde S2 okrog črne luknje, kot je pojasnjeno v Dodatku, gravitacija izdatno vpliva na frekvenco kot valovno dolžino svetlobe.

Če vpliv gravitacije na frekvenco svetlobe zmotno pripišemo Dopplerjevemu učinku, je lahko to usodna zmota pri ocenjevanju hitrosti opazovane zvezde s tem pa razumevanja temne snovi.

Vpliva gravitacije na lastnosti svetlobe lahko merimo na način, ki je predhodno opisan. Merimo vpliv gravitacije na frekvenco, valovno dolžino in hitrost svetlobe, ki prihaja iz gravitacijskega polja.

Tovrstne meritve še čakajo na izvedbo.

Merjenje hitrosti zvezd

Frekvenčni zamik nastane torej kot posledica gibanja vira svetlobe, kot tudi gravitacije. Vsak zamik se pojavi po svojih še neizmerjenih zakonitostih. Temno snov bomo lahko razumeli, ko bomo ločeno izmerili frekvenčni zamik, ki nastane kot posledica gibanja zvezde in ločeno frekvenčni zamik, kot posledica gravitacije.

V literaturi najdemo zmotne zapise, kjer se frekvenca svetlobe ocenjuje na osnovi vpadne valovne dolžine svetlobe λ_1, kar je usodna zmota.

Primer take zmote je v rezultatu meritve svetlobe, ki ima izvor v bližini črne luknje, na zvezdi S2[1].

measurement. The measurement is feasible with standard astronomical measuring equipment.

Measuring the speed of light

The frequency of the light in front of the grating is the same as the measured frequency of the light behind the grating.

In front of the grid, we can measure the wavelength of light λ_1. The speed of light in front of the grating is equal to the product of the measured frequency and the wavelength of light in front of the diffraction grating **λ_1**. The speed of light in front of the grid is (c+v) = f.λ_1.

The influence of gravity on the properties of light

When investigating dark matter, it is important to know the effect of gravity on the properties of light. Based on the knowledge of the orbit of the S2 star around the black hole, as explained in the Appendix, gravity affects the frequency as the wavelength of light.

If the influence of gravity on the frequency of light is erroneously attributed to the Doppler effect, this can be a fatal error in estimating the velocity of the observed star, and thus in understanding of dark matter.

The effects of gravity on the properties of light can be measured in the manner previously described. We measure the effect of gravity on the frequency, wavelength and speed of light coming from the gravitational field.

Such measurements are still waiting to be carried out.

Measuring the speed of stars

The frequency shift is therefore caused by the movement of the light source, as well as gravity. Each shift appears according to its as yet unmeasured laws. We will be able to understand dark matter when we separately measure the frequency shift that occurs as a result of the motion of the star and separately the frequency shift as a result of gravity.

In the literature we find erroneous records where the frequency of light is estimated based on the wavelength of light $\lambda 1$, which is a fatal error.

An example of such an error is in the result of a measurement of light that originates near a black hole on the starS2[2].

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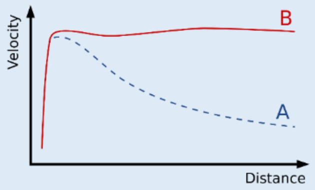
[1] Detection of the gravitational redshift in the orbit of the star S2 near the Galactic centre massive black hole - https://www.aanda.org/articles/aa/full_html/2018/07/aa33718-18/aa33718-18.html



Wikipedia[2]

Diagram zmotno prikazuje domnevno hitrost rotiranja v tipični spiralni galaksiji:

A - napovedana in
B – opazovana ob napačnih predpostavkah.

Temna snov

V tem zapisu so omenjene meritve svetlobe, ki še niso bile opravljene. Ko bodo le-te opravljene so dane možnosti za nova odkritja, ki bi lahko razjasnila naravo temne snov.

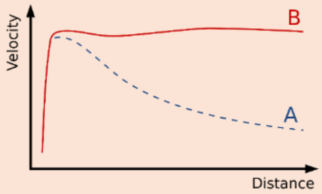
Pogled na temno snov bo po izvedbi teh meritev in pridobitvi še neznanih rezultatov teh meritev, lahko precej drugačen od današnjega. Morda bodo nove meritve pokazale, da ni potrebe po obstoju temne snovi.

V zgodovini smo se že večkrat čudili pojavom, ki jih nismo razumeli. Pripisali smo jih nadnaravnemu. Tudi aktualni opis temne snovi spominja na nadnaravno. To nadnaravno je zapisano le v današnjem bolj sodobnem jeziku.

Izhod iz nadnaravnega lahko najdemo v objektivnem merjenju hitrosti na videz čudnih gibanj zvezd.

Zaključek

Ne vemo, katera pot raziskovanja temne snovi je prava, dokler ne pridemo do cilja. Vemo pa, da če smo na napačni poti, nikoli ne bomo prišli do cilja, ne glede na vložen trud



Wikipedia[3]

The diagram shows the assumed rotation speed in a typical spiral galaxy:

A - predicted and
B - observed on the wrong assumptions.

Dark matter

This record mentions the measurements of light that have not yet been made. When these are completed, possibilities are given for new discoveries that could clarify the nature of dark matter.

The view of dark matter may be quite different from today's after these measurements are performed and the still unknown results of these measurements are obtained. Perhaps new measurements will show that there is no need for dark matter to exist.

Many times in history we have been amazed by phenomena that we did not understand. We attributed them to the supernatural. Even the current description of dark matter is reminiscent of the supernatural. This supernatural is only written in today's more modern language.

The way out of the supernatural can be found in the objective measurement of the speed of the seemingly strange movements of the stars.

Conclusion

We don't know which dark matter research path is the right one until we get there. But we know that if we're on the wrong path, we'll never get there, no matter how hard we try.

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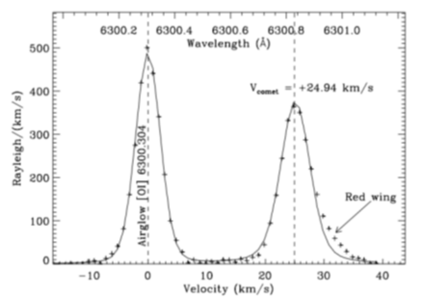
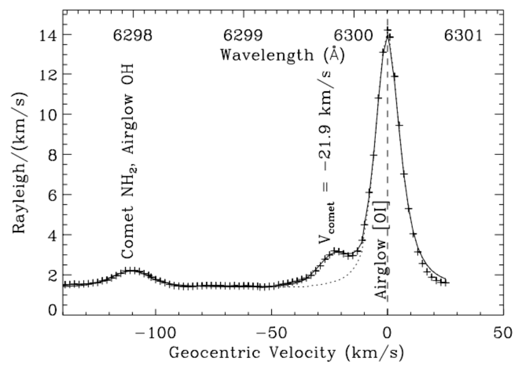
[2] https://en.wikipedia.org/wiki/Dark_matter

DODATEK	APPENDIX
Rezultat meritve svetlobe je odvisen od tega, ali je merilni instrument občutljiv na frekvenco svetlobe, ali le na njeno valovno dolžino. Omenim naj nekaj meritev, ki so bile opravljene z merilnim instrumentom, ki je občutljiv le na valovno dolžino svetlobe.	The result of light measurement depends on whether the measuring instrument is sensitive to the frequency of light or only to its wavelength. Let me mention some measurements that were made with a measuring instrument that is only sensitive to the wavelength of light.
Mirujoča sončeva korona	***The solar corona at rest***
Inštitut za astronomijo Sternberg[A] v Moskvi je meril hitrosti Sončeve korone v času sončnega mrka na osnovi Fabry-Perotovega interferometra. Gibanje delcev v Sončevi koroni ni povzročilo sprememb valovne dolžine svetlobe. Rezultate meritev so zmotno razumeti kot mirujočo Sončevo korono.	The Sternberg Institute of Astronomy[A] in Moscow measured the velocities of the Sun's corona during a solar eclipse based on the Fabry-Perot interferometer. The movement of particles in the Sun's corona did not cause changes in the wavelength of light. The results of the measurements are mistakenly understood as a stationary solar corona.
Podobna meritve je bila opravljena tudi s satelita SOHO[B]. Izmerjen je bil neznaten raztros valovnih dolžin bi dovoljeval hitrosti delcev v koroni do nekaj km/s.	Similar measurements were also made from the SOHO[B] satellite. An insignificant scattering of wavelengths was measured would allow particle velocities in the corona up to some km/s.
Ta neznaten raztros valovne dolžine izhaja iz pospeškov delcev, ne pa iz njihovih hitrosti.	This negligible wavelength scatter arises from particle accelerations, not from their velocities.
Četudi bi ta raztros valovnih dolžin pripisali hitrostim delcev, bi bile te hitrosti za deset do sto krat manjše od vizualno opažene hitrosti delcev s teleskopi.	Even if this scattering of wavelengths were attributed to particle velocities, these velocities would be ten to a hundred times smaller than the visually observed particle velocities with telescopes.
Mirujoča korona oziroma neznatne hitrosti sončeve korone so bile zmotno pripisane valovni dolžini svetlobe, le-ta pa ni odvisna od hitrosti vira svetlobe.	The quiescent corona or the insignificant velocities of the solar corona were mistakenly attributed to the wavelength of light, which does not depend on the speed of the light source.
[A] *Delone, Makarova, Yakunina: "Evidence for Moving Features in the Corona from Emission Line Profiles Observed During Eclipses", Moskva, 1987.* [B] *http://en.wikipedia.org/wiki/Redshift.*	[A] *Delone, Makarova, Yakunina: "Evidence for Moving Features in the Corona from Emission Line Profiles Observed During Eclipses", Moskva, 1987.* [B] *http://en.wikipedia.org/wiki/Redshift.*
Merjenje hitrosti kometa	**Measuring the speed of the comet**
Leta 2001 so v ZDA z merilnikom WHAM merili svetlobo s kometa Hale-BOPP[C]. V teleskopu je bila nameščena mrežica z namenom, da na njej astronomi opazujejo sliko, ki jo teleskop prenaša na merilni instrument. Mrežica ni bila gosta. Izmerjen rezultat je pokazal, da svetloba prihaja z valovno dolžino, ki ni odvisna od hitrosti kometa, del svetlobe pa ima na mrežici spremenjeno valovno dolžino.	In 2001, the light from comet Hale-BOPP was measured[C] with the WHAM instrument in the USA. A grid was installed in the telescope so that astronomers can observe the image that the telescope transmits to the measuring instrument. The grid was not dense. The measured result showed that the light comes with a wavelength that does not depend on the speed of the comet, while part of the light has a changed wavelength on the grid.



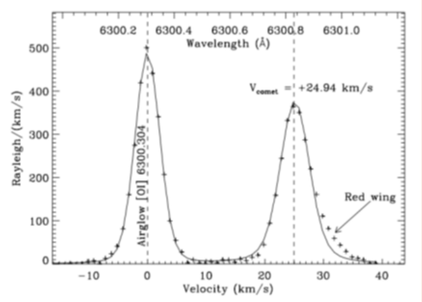
V nadaljevanju so mrežico odstranili. V tem primeru je le neznaten del svetlobe spremenil valovno dolžino, to je tisti delček svetlobe, ki je v teleskopu naletel na razne fizične ovire (žice, robove), ki so na način uklonske mrežice temu delčku svetlobe spremenile valovno dolžino.



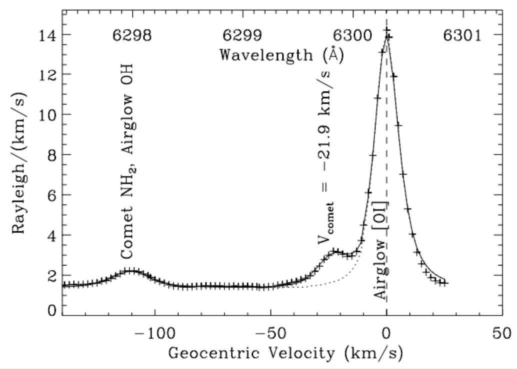
[C] 6300 Large Aperture Photometry of Comet Hale-BOPP

Zvezda S2

Zvezda S2[D] kroži okrog črne luknje tako, da je črne luknja po pričakovanjih v žarišču elipse. Astronomi so izmerili drugače. Izmerili so, da je črna luknja daleč od žarišča elipse. Ta njihov sklep je posledica zmotanega merjenja hitrosti zvezde. Niso ločeno merili vpliva hitrosti zvezde na frekvenco svetlobe in ločeno vpliva gravitacije na frekvenco svetlobe.



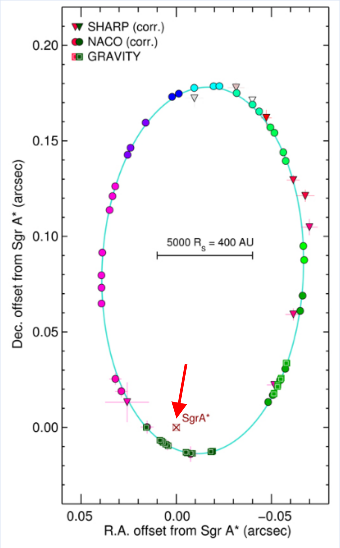
Subsequently the grid was removed. In this case, only an insignificant fraction of light changed its wavelength, that is, that fraction of light that encountered various physical obstacles (wires, edges) in the telescope, which changed the wavelength of the light in the manner of a diffraction grating.



[C] 6300 Large Aperture Photometry of Comet Hale-BOPP

Star S2

The S2[D] star orbits the black hole so that the black hole is, as expected, at the focus of the ellipse. Astronomers measured differently. They measured that the black hole is far from the focus of the ellipse. This conclusion of theirs is the result of a mistaken measurement of the velocity of the star. They did not separately measure the effect of the star's speed on the frequency of light and the separate effect of gravity on the frequency of light.

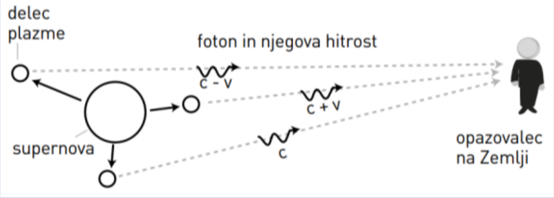


[D] Detection of the gravitational redshift in the orbit of the star S2 near the Galactic centre massive black hole. Published: 2018

Temna energija

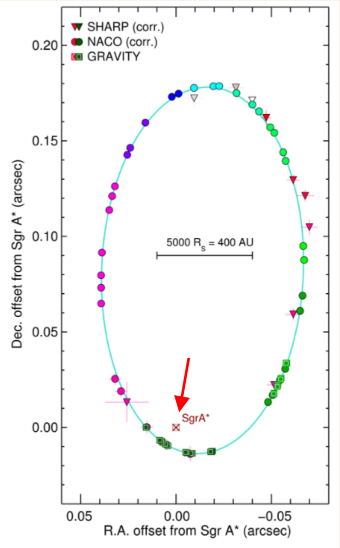
Na supernovah se lahko dogajajo hipne eksplozije. Zaradi različnih hitrosti svetlobe jih na Zemlji ne opazimo kot hipne pojave.

Večja oddaljenost supernove ob različnih hitrostih svetlobe na poti do Zemlje časovno razvlečejo svetlobni pojav.



Zaradi različnih hitrosti svetlobe, bomo hipno eksplozijo supernove na Zemlji opazovali tedne, mesece ali celo leta.

In še nekaj opazimo. Najprej nas dosežejo žarki z delcev, ki potujejo proti nam, nazadnje pa žarki iz delcev, ki se nam oddaljujejo. To pa ustvari lažen vtis, da se supernova oddaljuje. Tako videnje oddaljevanja supernovi pa zmotno pripisujemo temni energiji.

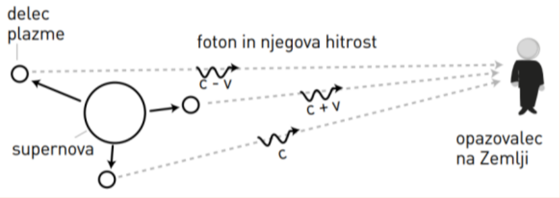


[D] Detection of the gravitational redshift in the orbit of the star S2 near the Galactic centre massive black hole. Published: 2018

Dark energy

Supernovae can experience sudden explosions. Due to the different speeds of light, they are not observed on Earth as instantaneous phenomena.

The larger distance of the supernova with the different speeds of light on the way to Earth makes the light phenomenon time-stretched.



Due to the different speeds of light, we will observe the sudden explosion of a supernova on Earth for weeks, months or even years.

And we notice something else. We are first reached by rays from particles traveling towards us, and lastly by rays from particles traveling away from us. This give the false impression that the supernova is moving away. However, the sight of receding supernovae is mistakenly attributed to dark energy.