

# Czy istnieje kolor różowy?

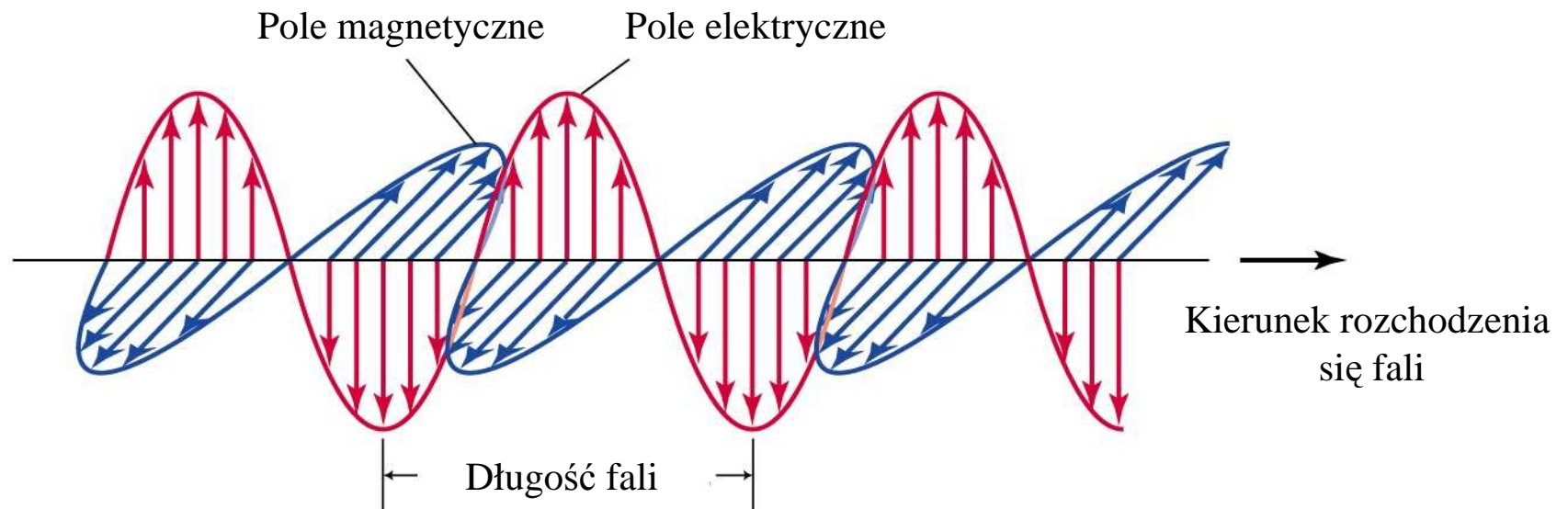
Rafał Demkowicz-Dobrzański



# Światło

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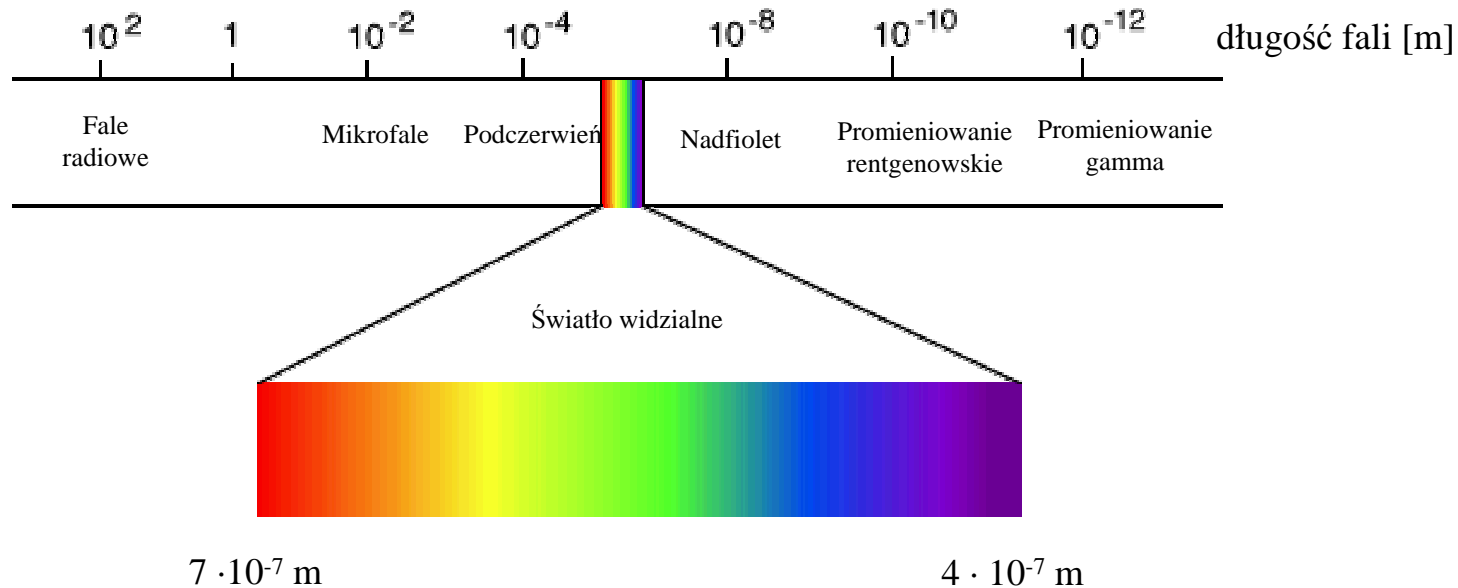
- Światło jest falą elektromagnetyczną
- Fala elektromagnetyczna o określonej długości fali:



# Widmo fal elektromagnetycznych

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- Światło widzialne odpowiada falom e-m, o długościach fal z zakresu 400-700 nm

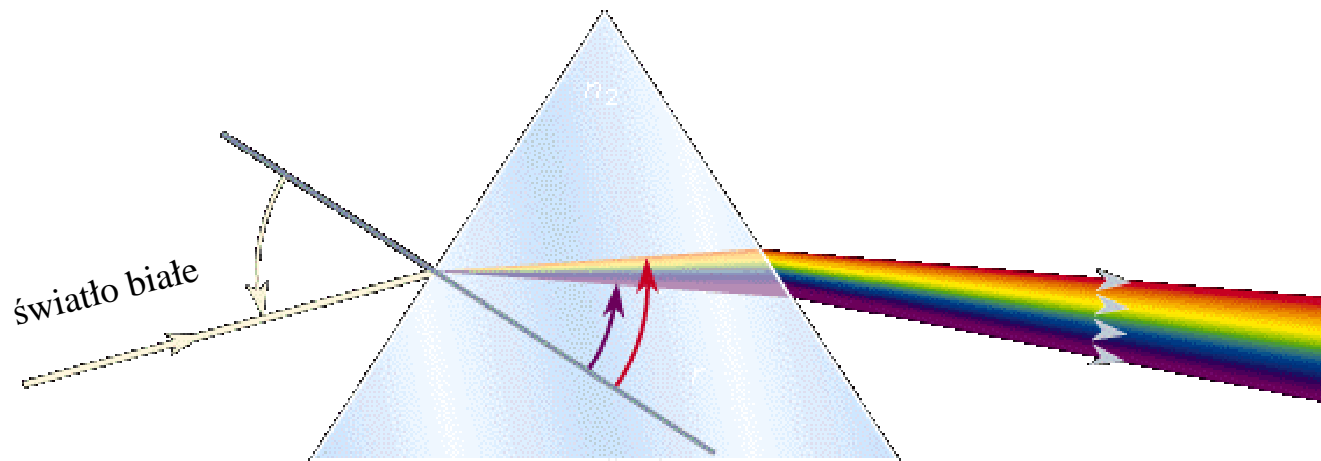


- Różne długości fal to różne kolory

# Obserwacja widma

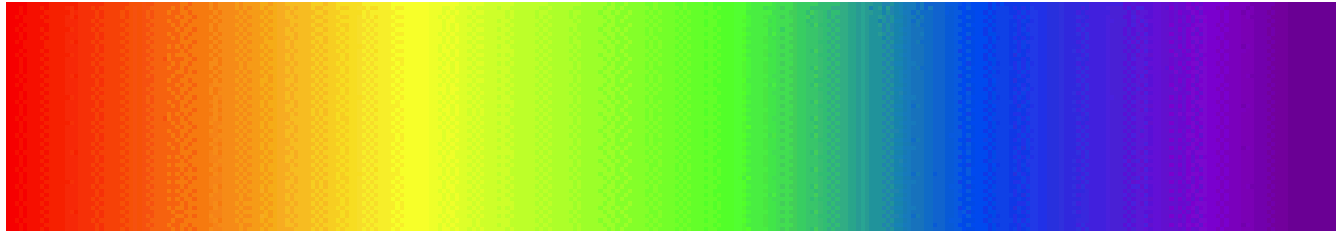
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- Współczynnik załamania światła w szkle zależy od długości fali
- Światło białe można rozszczepić na pryzmacie



# Gdzie jest różowy?

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Kolor  $\neq$  określona długość fali  
elektromagnetycznej

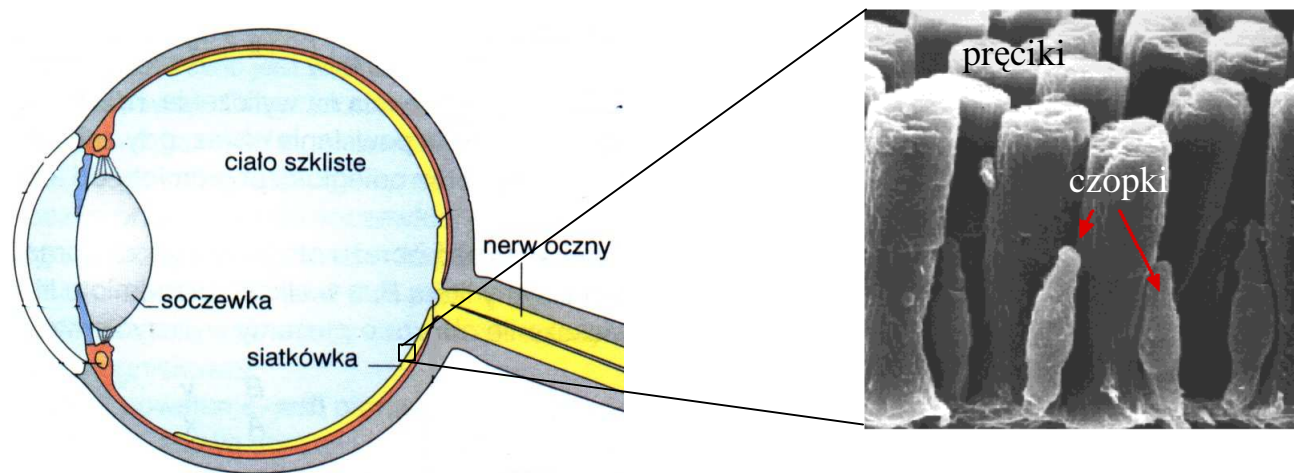
Kolor to wrażenie!

# Mechanizm widzenia kolorów

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- Czopki i pręciki

W siatkówce znajdują się pręciki i **trzy rodzaje czopków**. Pręciki niosą informację o jasności, natomiast czopki są odpowiedzialne za postrzeganie kolorów.

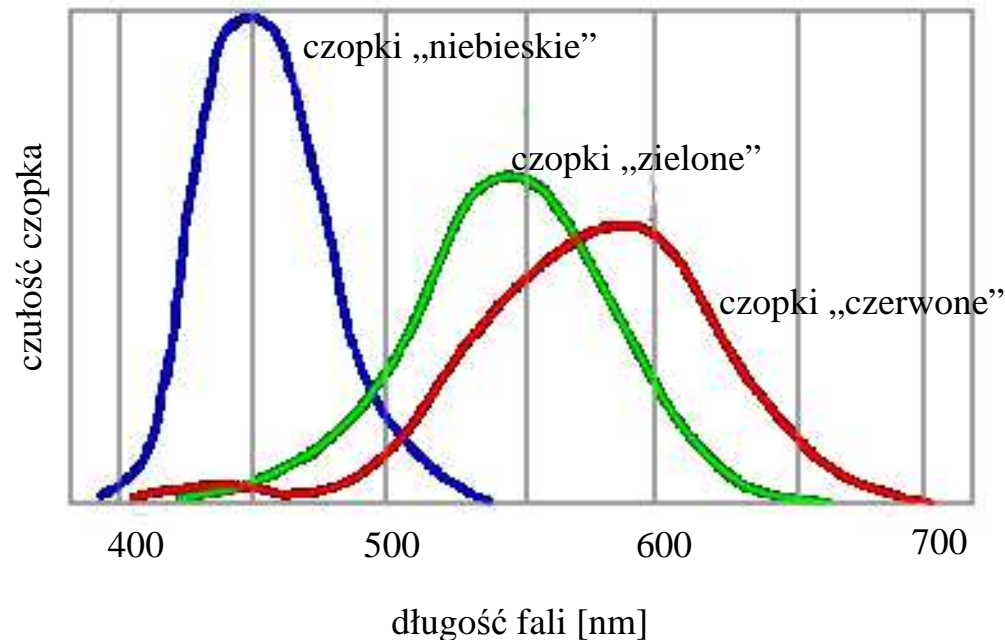


# Mechanizm widzenia kolorów

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- Czopki

Każdy z trzech rodzajów czopków jest czuły na światło z innego zakresu długości fali:



Padające światło, składające się z fal e-m różnej długości pobudza z różną intensywnością, każdy z trzech rodzajów czopków - to powoduje powstanie wrażenia koloru.

# Różne światło – ten sam kolor

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- To samo wrażenie koloru żółtego może być spowodowane przez:
  - falę e-m o długości około 570 nm
  - światło, w którego skład wchodzi fale o długościach 650 nm (czerwony) i 530 nm (zielony) z równą intensywnością (tak tworzy się żółty w systemie RGB)
- Wrażenie koloru białego może być spowodowane:
  - mieszaną wszystkich widzialnych długości fali e-m, ze zbliżonymi intensywnościami
  - złożenie ze sobą fal tylko o trzech różnych długościach 650 nm (czerwony), 530 nm (zielony), 450 nm (niebieski)





the first two years of life. The first year of life is characterized by rapid growth and development, and the second year by continued growth and development, but at a slower rate than the first year.

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The first part of the document discusses the importance of maintaining accurate records in a laboratory setting. It emphasizes the need for clear labeling and consistent data entry to ensure the reliability of experimental results. The text also touches upon the ethical considerations of data handling and the potential consequences of negligence.

In the second section, the author details the various methods used for data collection and analysis. This includes a comparison of manual versus automated data recording techniques, highlighting the advantages of automation in terms of speed and accuracy. The discussion also covers statistical methods used to interpret the collected data, such as regression analysis and hypothesis testing.

The third part of the document focuses on the practical aspects of laboratory safety and equipment maintenance. It provides a comprehensive list of safety protocols that must be followed at all times to prevent accidents and ensure the well-being of all personnel. Additionally, it outlines the regular maintenance schedules for key pieces of laboratory equipment, ensuring they remain in optimal working condition.

Finally, the document concludes with a summary of the key findings and a call to action for continuous improvement in laboratory practices. It encourages researchers to stay updated on the latest advancements in their field and to share their knowledge and experiences with colleagues to foster a collaborative and innovative research environment.





the 1990s, the number of people who have been infected with HIV has increased in almost every country in the world. In 1990, there were 1.5 million people living with HIV, but by 2000, this number had risen to 36 million (UNAIDS 2001).

There are a number of reasons why the number of people living with HIV has increased so rapidly. One of the main reasons is that the virus is highly contagious. It can be transmitted through sexual contact, blood transfusion, and sharing of needles. In addition, the virus can survive outside the body for several days, which makes it even more difficult to control.

Another reason why the number of people living with HIV has increased so rapidly is that there is no cure for the virus. While there are treatments available that can help to control the virus and prevent it from spreading, these treatments do not eliminate the virus from the body. As a result, people who are infected with HIV will remain infected for the rest of their lives.

Finally, the number of people living with HIV has increased so rapidly because of the lack of awareness and education about the virus. In many parts of the world, people do not know how to protect themselves from HIV. They may not know that using condoms can help to prevent the virus from being transmitted, or they may not know that sharing needles is a high-risk activity.

There are a number of things that can be done to help to control the spread of HIV. One of the most important things is to increase awareness and education about the virus. People need to know how to protect themselves from HIV, and they need to know that there is no cure for the virus. In addition, there need to be more resources available to help people who are infected with HIV to get the treatment they need.

Another important thing that can be done is to reduce the stigma associated with HIV. People who are infected with HIV often face a great deal of discrimination and prejudice. This can make it difficult for them to get the treatment they need and to live their lives. It is important to educate people about HIV so that they can understand that it is a medical condition, not a moral failing.

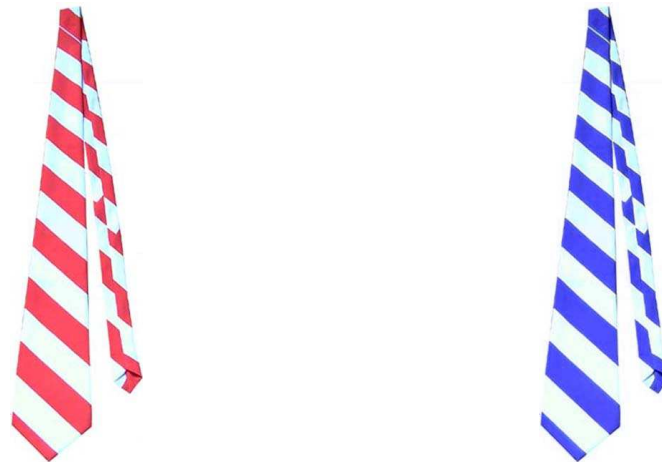
Finally, there need to be more resources available to help people who are infected with HIV. This includes resources for medical treatment, as well as resources for social support and counseling. People who are infected with HIV need to know that they are not alone, and they need to know that there are people who care about them and who want to help them.

There is a great deal of work that needs to be done to help to control the spread of HIV. It is important that we all do our part to help to reduce the number of people who are infected with this virus. We need to increase awareness and education, we need to reduce the stigma associated with HIV, and we need to provide more resources to help people who are infected with HIV.

# Nieistnienie kolorów

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- Kolory to czysto subiektywne wrażenia. Istnieją tylko jako wrażenia wewnątrz organizmów, które je postrzegają
- Moje wrażenie czerwonego, może być tym co dla ciebie jest wrażeniem niebieskiego. Nigdy tego nie sprawdzimy.



Kolory nie istnieją!



Istnieją fale elektromagnetyczne!