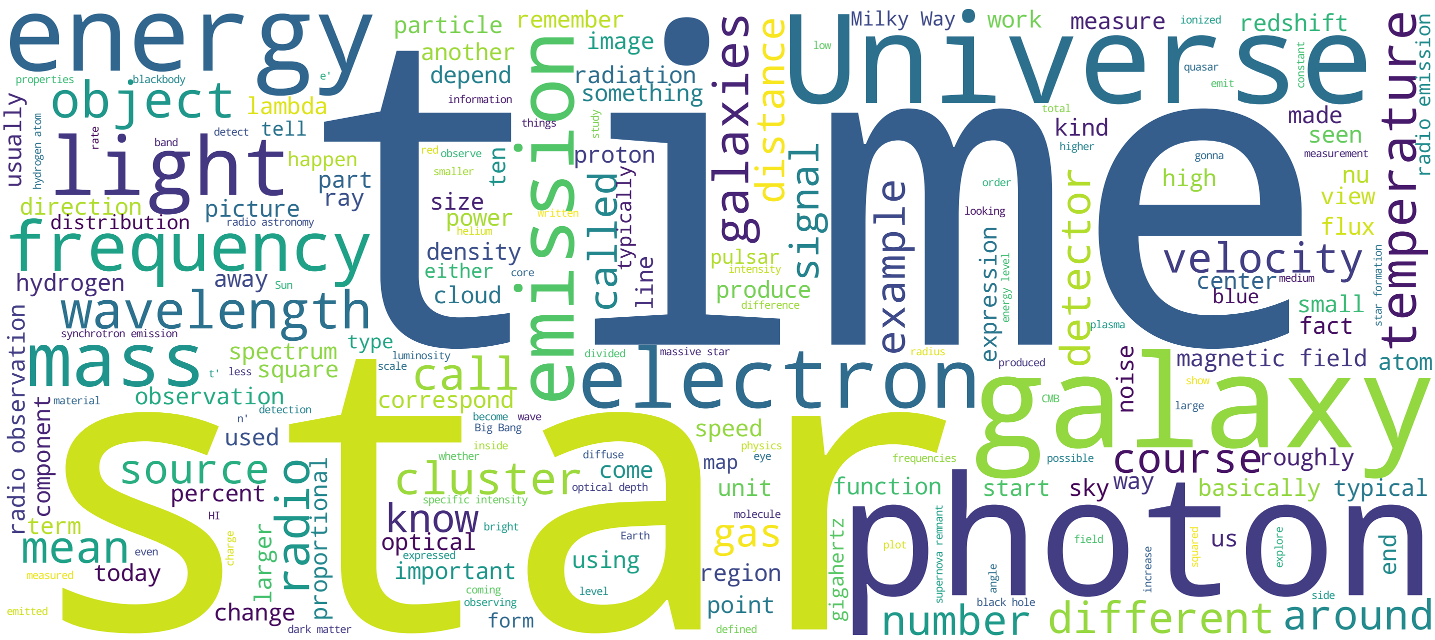


Search MOOC

Video

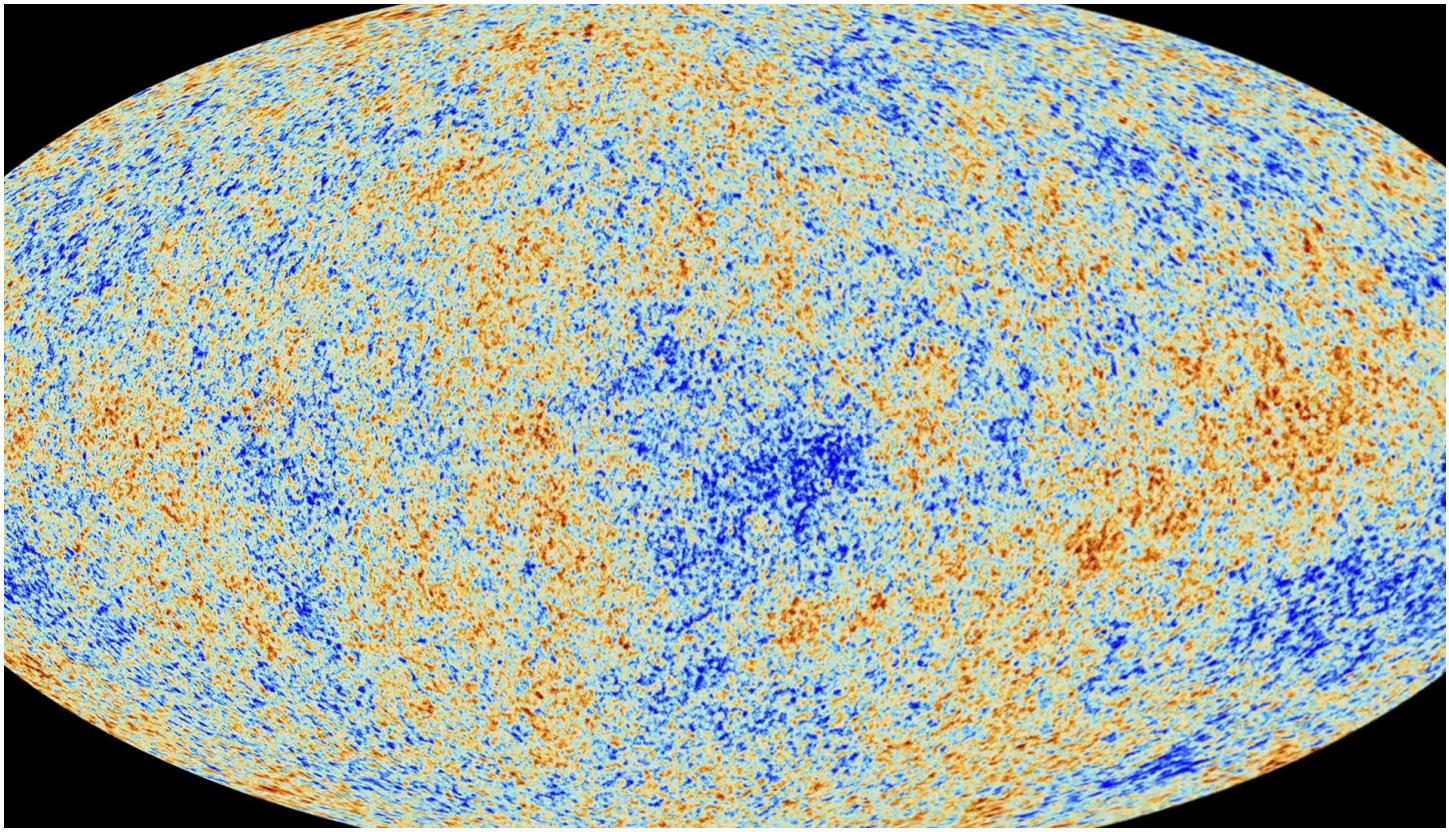
EPFL

Hello everyone. I'm Jean-Paul Kneib, Professor of Astrophysics at EPFL. I would like to invite you to take our new online course in radio astronomy. One could say that radio astronomy is the study of the hidden years. Indeed, the radio sky is extremely different from the sky we see with our eyes or with optical telescope. Many sources, bright in optical, such as stars, are weak in radio. For this reason originally, radio observations were considered of limited scientific value but today, we know that radio observation can reveal many unexpected, exotic and new objects that can substantially improve our understanding of the Universe. This hidden radio Universe is often a violent place filled with high energy and explosive event but it also reveal cold environment and more exotic phenomena such as dark matter and possibly dark energy in the future. Optical and radio observations are fully complementary techniques. They display complementary different views of the Universe and consequently, they probe very different physics. In this course, we will explore some of the unique technical and scientific feature of observing the radio.

Notes

Summary

0m 00s



The course deals with the basic technologies used to detect radio waves and the advantages and challenges presented by observing in radio sky. Radio telescope can be very simple or incredibly complex. In our effort to make the best and most sensitive radio observation of the Universe, the international community is now building the SKA, the Square Kilometer Array. SKA made up of two radio interferometer, will be one of the largest and most complex scientific instrument ever built by mankind. A follow-up of our course will present a more in-depth look at the data processing challenges of radio interferometers. The course is taught by myself and by a number of radio astronomers involved in the SKA project. We will learn about the physical processes which produce radio emission. We will use the information to explore the connection between the physics and the properties of the objects that we observe in the radio. Finally, we will finish the course by studying the most common and most important astrophysical radio objects. This includes supermassive black holes, spinning pulsars that one day can be used to detect gravitational waves, the burst clouds of massive stars, galaxies and clusters, and the cosmic microwave background which is the oldest radiation in the Universe emitted shortly after the Big Bang.

Notes

Summary

1m 30s

The course is aimed for students in their last year Bachelor or first year of Master. It requires some good basics in maths and physics. So do join us and turn to radio to study the incredible Universe.

Notes

Summary

3m 11s