

Astronomy

Unlike most physics disciplines, which are based on the conduct and analysis of experiments, astronomy is a collecting science that studies the messengers sent by the Universe.

Until the mid-20th century, astronomers depended on light and their vision of the sky was limited to the visible spectrum, i.e. radiation that can impress the retina of the eye. This excluded from their investigation field all the stars emitting very little, if any, in the visible range but shining brightly in other ranges.

It is not until the late 1940s that astronomers began to use radio waves, drawing on radar techniques developed during WWII. The exploration of the sky with all its varied radiations only really got underway at the end of the last century. The raging rivalry between the United States and the defunct Soviet Union until the fall of the Berlin Wall led to a meteoric development in space technology. Astronomers took the opportunity to place equipment far from Earth to collect the many messengers blocked or altered by the atmosphere. Finally, at the turn of the 21st century, physicists of the infinitely small came to support astronomical research by chasing cosmic particles and gravitational waves.

Astronomy has thus undergone a major revolution, far greater than the one Galileo started when he decided to point a telescope towards the celestial vault. Rightly recognised as the oldest of the sciences, astronomy is now a thoroughly modern discipline: over the last twenty years, astronomers have learned more about the intimate nature of the Universe than in five millenia. While their distant ancestors dispaired of deciphering the sky, perched on their Tower of Babel made of clay and bricks, 21st-century astronomers can finally find some of its keys, with, in addition, all the ingredients to build the finest sky theory.

But how baffling the latest results have been! Fortunately, physics has forged the minds of observers so that they can make sense of all the signs they receive. Astronomers, who, less than a century ago, postulated that all matter in the Universe was in their own image, i.e. made up of atoms – a vision confirmed by stars – now know that humans are no longer at the centre of anything, either spatially or even materially. The atom century ended with the proclamation of the cosmic insignificance of atomic matter.

As they have penetrated ever deeper into space and time, astronomers are now confronted with the hot early Universe, so hot that particles have energies comparable to those generated by the best particle accelerators. Thus, physicists of the infinitely small, who strive to reproduce the conditions prevailing in the first ages of the Universe at the crossing of their particle beams, meet physicists of the infinitely large in their henceforth common quest for the origins of everything.



Credit: <https://www.johannesvermeer.org>

The Astronomer

Work painted by Johannes Vermeer in 1668, during the first astronomical revolution.