

Nobel goes to Astrophysics!

On the 6th of October 1995, a small announcement swept the world of Astrophysics off its feet. The first planet around a main sequence star outside our Solar System, known by the name of 51 Pegasi b, had been discovered.

This Tuesday, 24 years after the exciting announcement, the Nobel prize in Physics was finally awarded to Michel Mayor and Didier Queloz, the researchers who discovered 51 Pegasi b. The prize is to be shared with James Peebles, a renowned theoretical cosmologist who contributed to our understanding of the early universe.

Michel Mayor and Didier Queloz were respectively Professor and PhD student at the University of Geneva at the time of the discovery. Their announcement managed to open a door to understanding the formation of planetary systems and a myriad of technological advancements with respect to observation and detection. Thanks to these technological leaps, such as the rise of high-resolution spectroscopy, many other exoplanets were discovered soon after. To this day, we have catalogued around 4000 exoplanets, mostly thanks to efforts by NASA's Kepler Space Telescope. The majority of the people of the EPFL campus have not even lived in a world where we did not know of any exoplanets!

Why was this discovery so important at the time, and why does it remain so? Well, because knowing about the existence of Earth-like planets makes us realise just how small and insignificant our small tiny Earth is. Around the universe there might be many many other planets very similar to Earth. Studying exoplanets and their formation can also help give insight into the formation of our own Solar system, and where we came from. This is why the Swiss Space Office and ESA are planning to launch a space telescope, CHEOPS, whose goal is to accurately measure known

exoplanet properties and contribute to research on the formation of exoplanets. The mission is set to be launched at the end of this year. Who knows what discoveries it holds in store for us?

Exoplanet exploration has increasingly become about astrobiology, which looks for biosignatures in exoplanets' atmospheres in order to determine whether they are habitable. Of course, this leads to the question of extraterrestrial life. "Are we alone?" asks every curious person, looking up to the stars in wonder at the immensity of it all.

And our head cannot even wrap its head around how immense it all is! James Peebles is a leading cosmologist who has shaped our understanding of the universe. The universe is a gigantic structure, and astrophysicists struggle every day to find out what it is that we actually form a part of. Currently, our knowledge only comprises about 5% of the entire content of the universe. The rest of the universe, which we know virtually nothing about, is all dark matter and dark energy. The existence of dark matter has been observationally deduced mainly from measurements of galaxy rotation curves, and dark energy is something needed in order to explain the accelerating expansion of the universe. But what exactly are they? We do not know. However, thanks to James Peebles' contributions we at least have a theoretical framework to understand how all the matter that we do see - that 5% of the universe - emanated from the small fluctuations in the young universe.

The mysteries that the universe holds for us are still aplenty. Hopefully, this year's Physics Nobel prize inspires young space and astrophysics enthusiasts to go forward in their field with passion, a field which very rarely receives prizes like these. In any case, we sure are starstruck with this announcement!