Pushing the edge of the Cosmic frontier with the James Webb Space Telescope

Dr. Dominika Wylezalek

Astronomisches Recheninstitut, Universität Heidelberg

The James Webb Space Telescope (JWST, or Webb), a joint NASA, ESA and CSA mission, was launched on Christmas 2021 and is the largest, most powerful and complex space telescope. It is an orbiting infrared observatory that complements and extends the discoveries of the Hubble Space Telescope, with longer wavelength coverage and greatly improved sensitivity. The longer wavelengths enable JWST to look much closer to the beginning of time and to hunt for the unobserved formation of the first galaxies. The JWST is also revolutionising our understanding of black hole-galaxy co-evolution by allowing to probe the stellar, gas, and dust components of nearby and distant galaxies, spatially and spectrally. The question of how central black holes in galaxies influence their host galaxies is one of the key questions that this 10 billion dollar observatory was designed to address. In this talk, I will provide an overview of JWST's recent discoveries with respect to probing the first galaxies in the Universe that existed when the Universe was just a few Million years old. In addition, I will report on the first results from our JWST Early Release Science Program "Q3D" that was chosen as one of 13 programs worldwide to be executed first. Q3D is investigating how energetic outflows driven by actively accreting supermassive black holes impact their host galaxies in the early Universe.