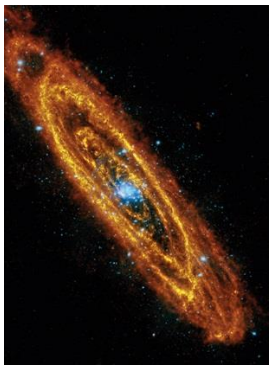
The Andromeda Galaxy in infrared and X-rays



Jacopo Fritz and Maarten Baes (Sterrenkundig Observatorium, WE05), W. Pietsch (MPE), ESA/Herschel/PACS and SPIRE, ESA/XMM-Newton/EPIC

The Andromeda Galaxy is our Milky Way galaxy's nearest large neighbor. It is located about 2.5 million light-years away and holds up to an estimated trillion stars. Our Milky Way is thought to contain about 200 billion to 400 billion stars.

This mosaic of the Andromeda spiral galaxy highlights explosive stars in its interior, and cooler, dusty stars forming in its many rings. The image is a combination of observations from the Herschel Space Observatory taken in infrared light (seen in orange hues), and the XMM-Newton telescope captured in X-rays (seen in blues).

Herschel provides a detailed look at the cool clouds of star birth that line the galaxy's five concentric rings. Massive young stars are heating blankets of dust that surround them, causing them to glow in the longer-wavelength infrared light, known as far-infrared, that Herschel sees.

In contrast, XMM-Newton is capturing what happens at the end of the lives of massive stars. It shows the high-energy X-rays that come from, among other objects, supernova explosions and massive dead stars rotating around companions. These X-ray sources are clustered in the center of the galaxy, where the most massive stars tend to form.

This image highlights the beautiful complexity of galaxies, the island universes that can be considered as the building blocks of the Universe. Understanding the physical mechanisms that drive this complexity is one of the main goals of the astronomy courses in the Physics and Astronomy degree at Ghent University.

The Herschel data for this image were taken in the frame of the Herschel Exploitation of Local Galaxy Andromeda (HELGA) project, a large international project led by UGent astronomers. The image was first shown in the BBC Stargazing Live show (https://www.youtube.com/watch?v=wXvJ6FmYA0Y).