

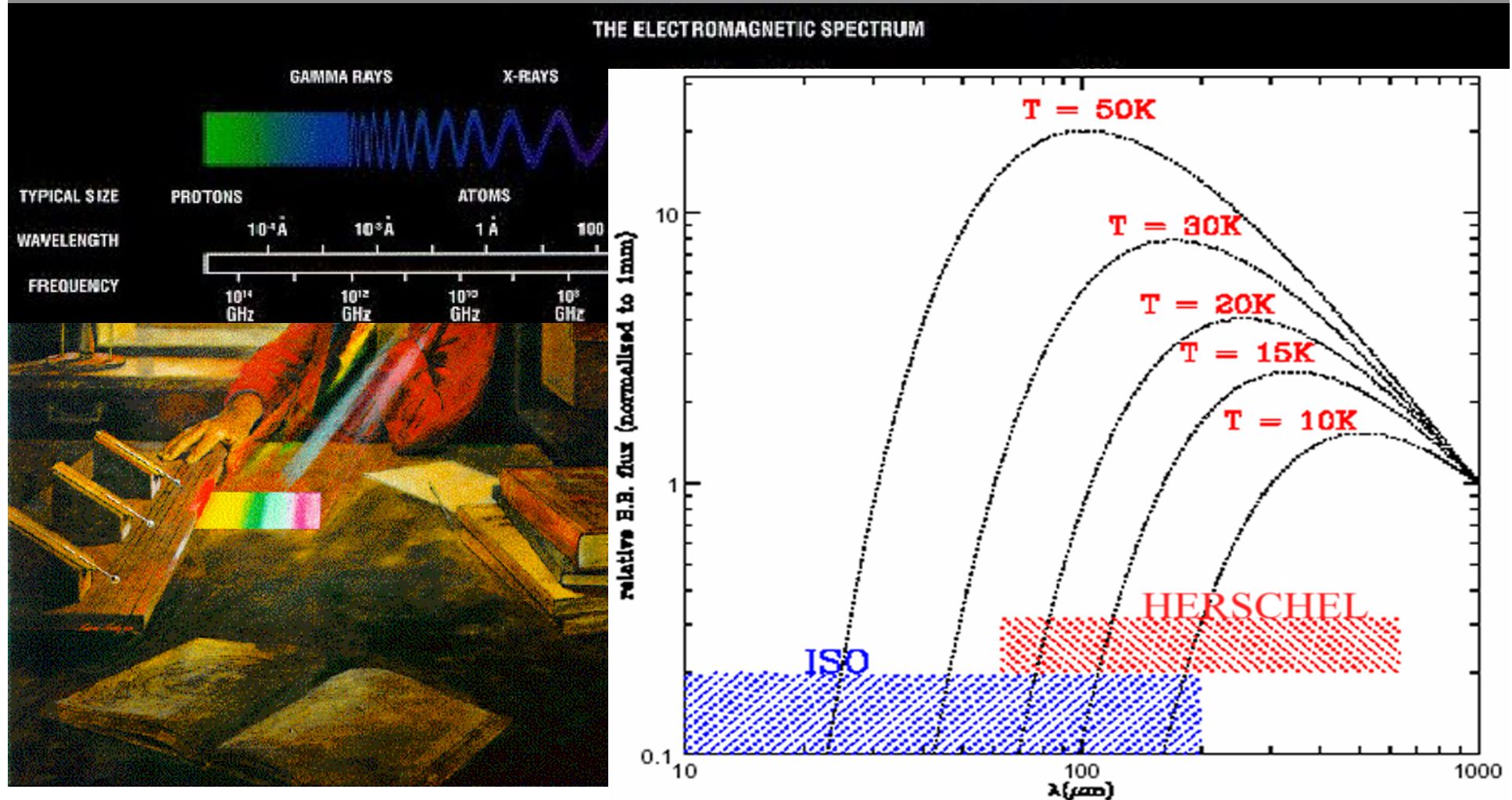
Herschel Initial Science



Seeing what nobody has seen before...

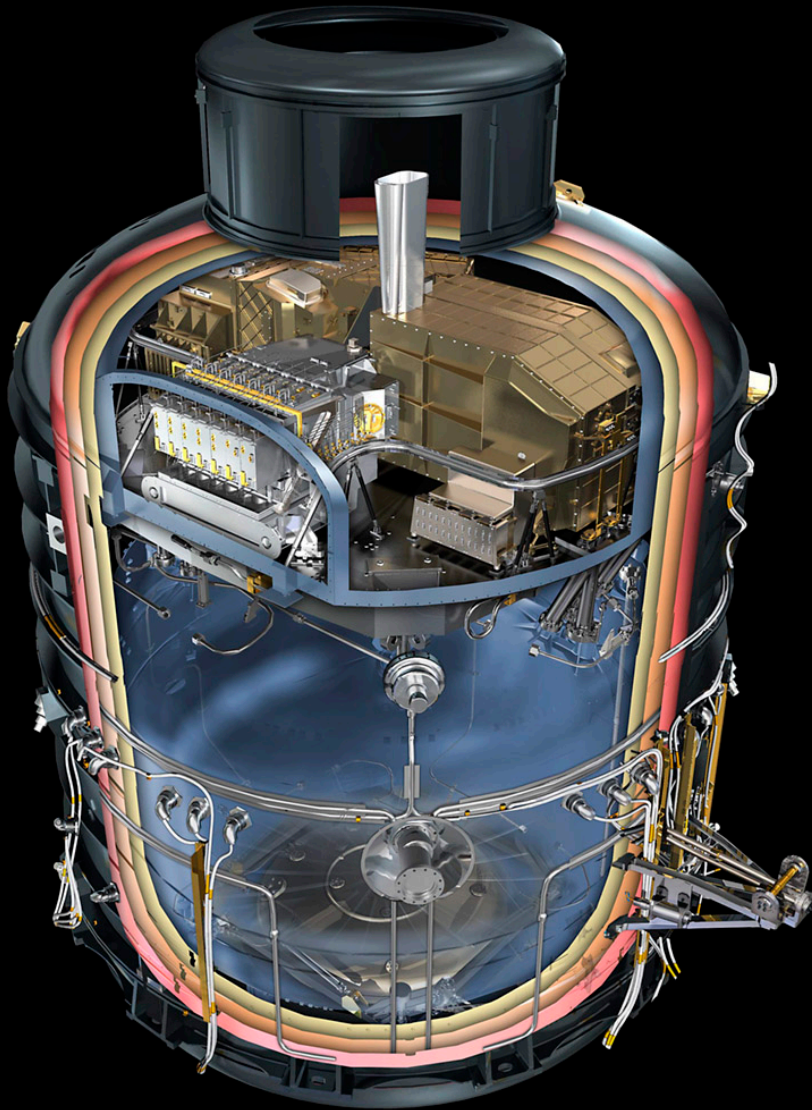


Pushing into the far infrared and submillimetre



– Longer wavelengths means colder temperatures

Spacecraft



Fairing integration on 10 May 2009



V188 rollout on 13 May 2009



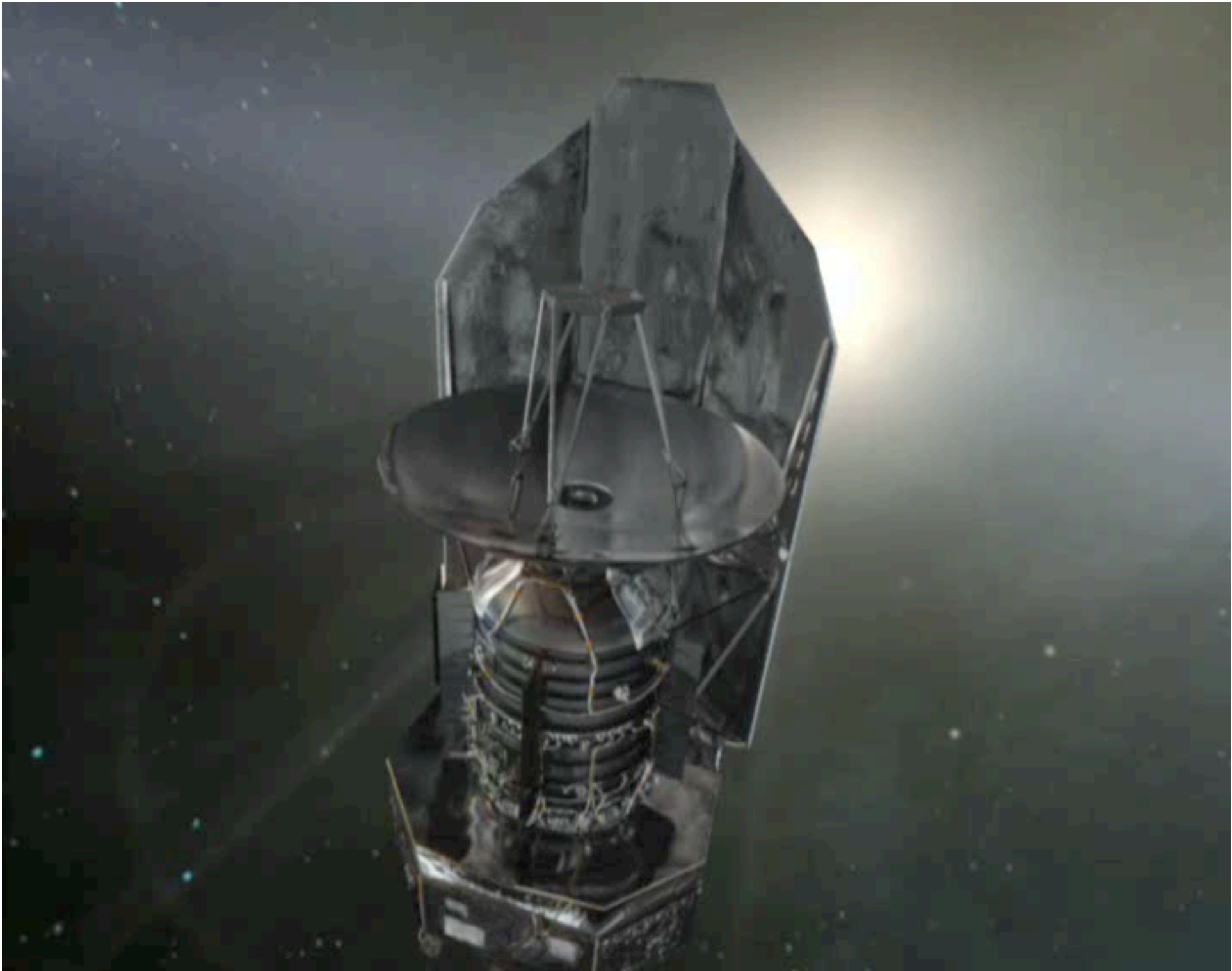
V188 launch on 14 May 2009



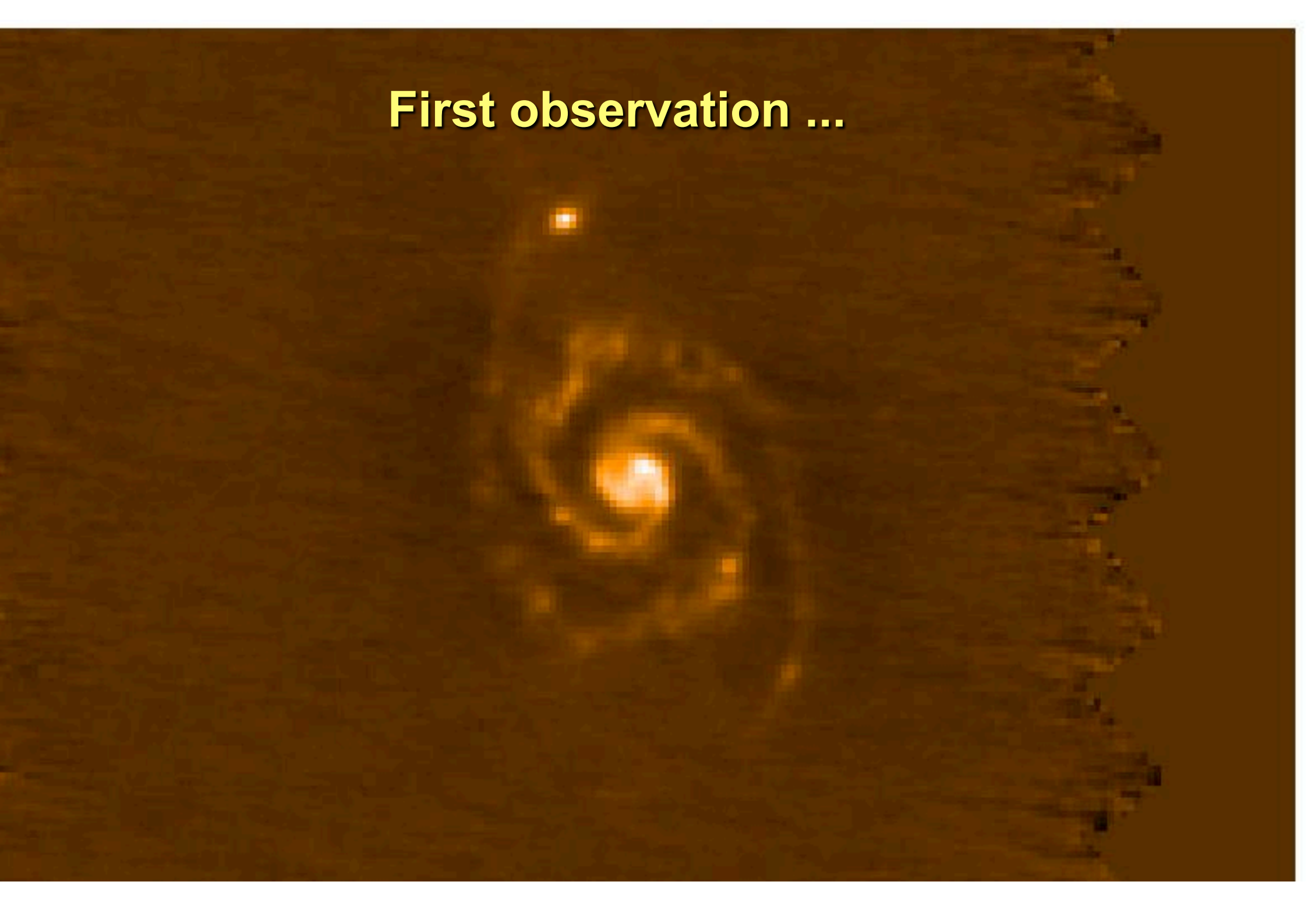
Getting ready



- **Launch on 14 May 2009**
- **Commissioning Phase ~2 months**
 - Functional testing
 - Cryocover opening after ~1 month
- **Performance Verification Phase ~3 months**
 - Optimisation of observing
- **Science Demonstration Phase ~1 month**
 - Try out observing programmes – get initial science as ‘by-product’
 - Workshop with more than 200 astronomers
- **Routine Science Phase**



First observation ...



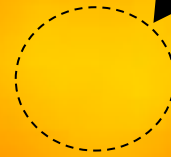
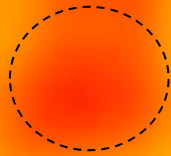
... we have come a long way!



Makemake

Negative
image

Positive
image



Comets – probing the water production



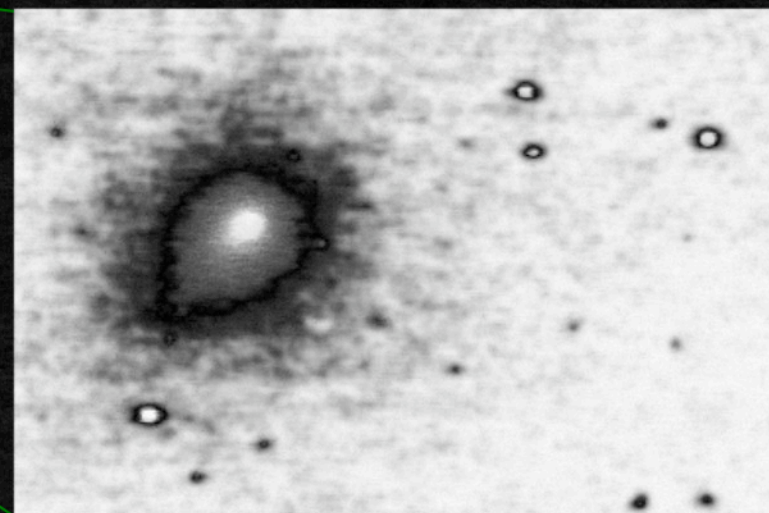
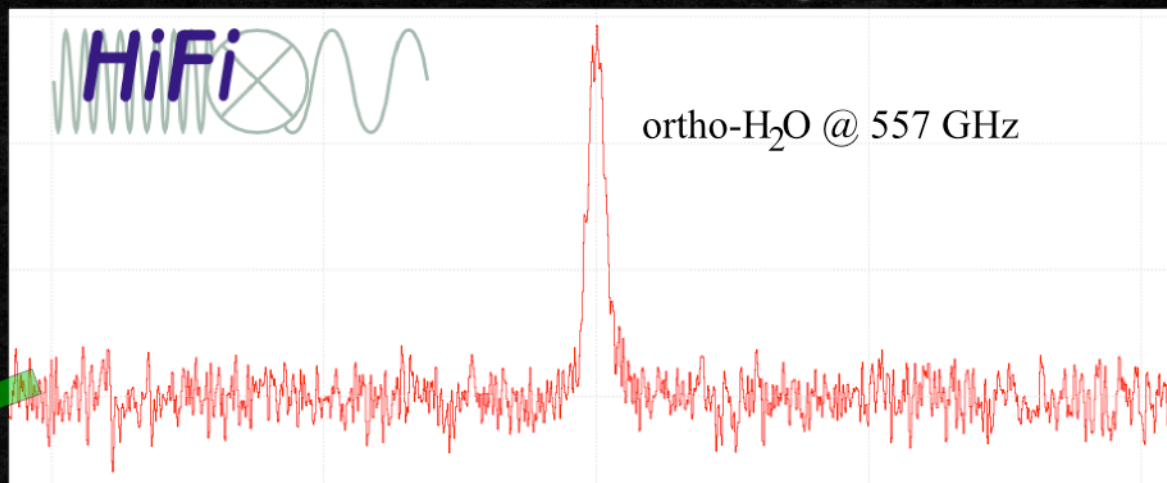
Giotto's look on
comet Halley



Water in C/2008 Q3 Garradd

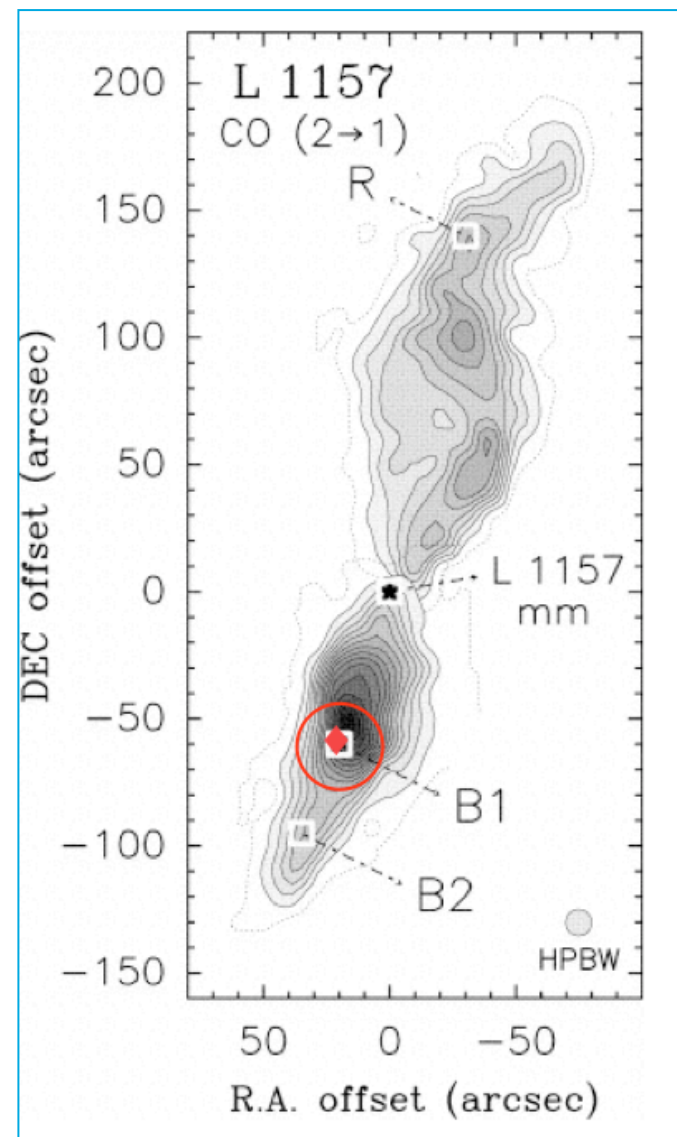
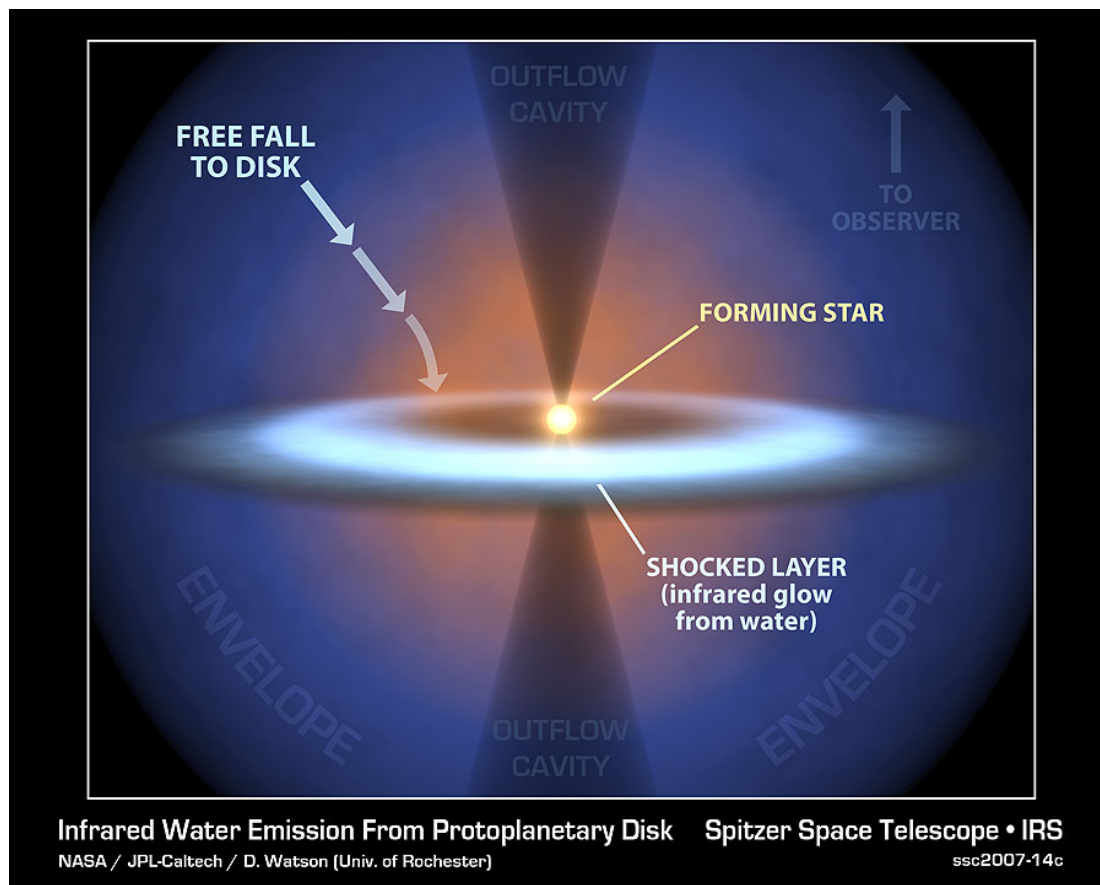


HSSO

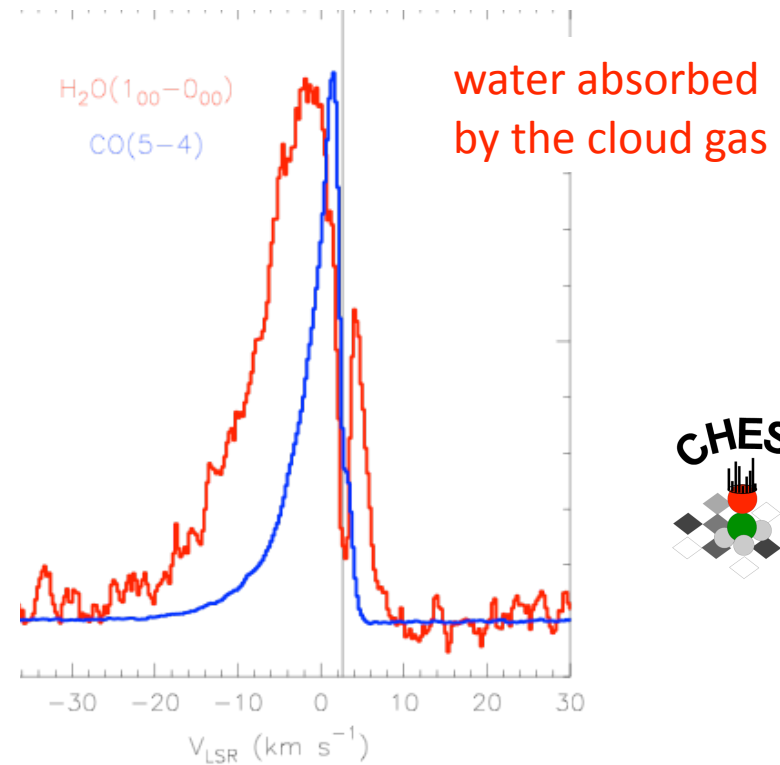
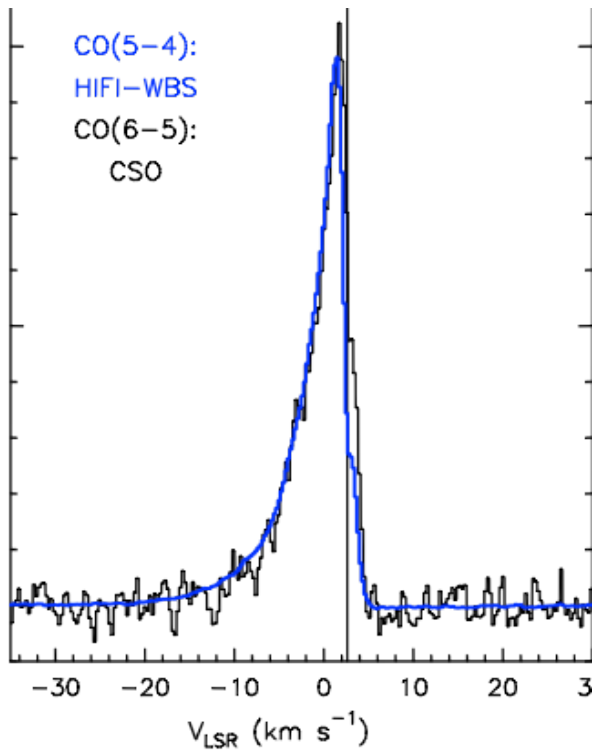


spectrum © ESA and the HIFI consortium
background © Bradford Robotic Telescope

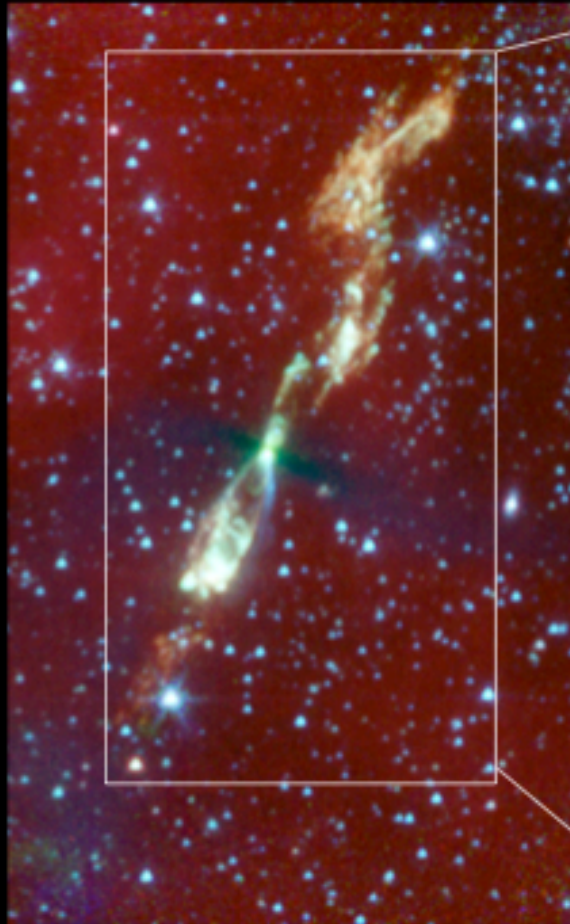
Star-formation – peering into shocks



L1157-B1 & HIFI: peering into a shock



Spitzer IRAC

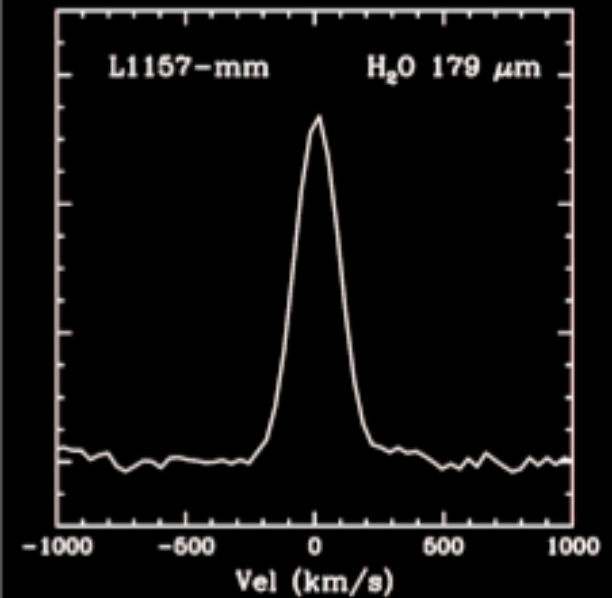


Herschel PACS

H₂O
179 μm

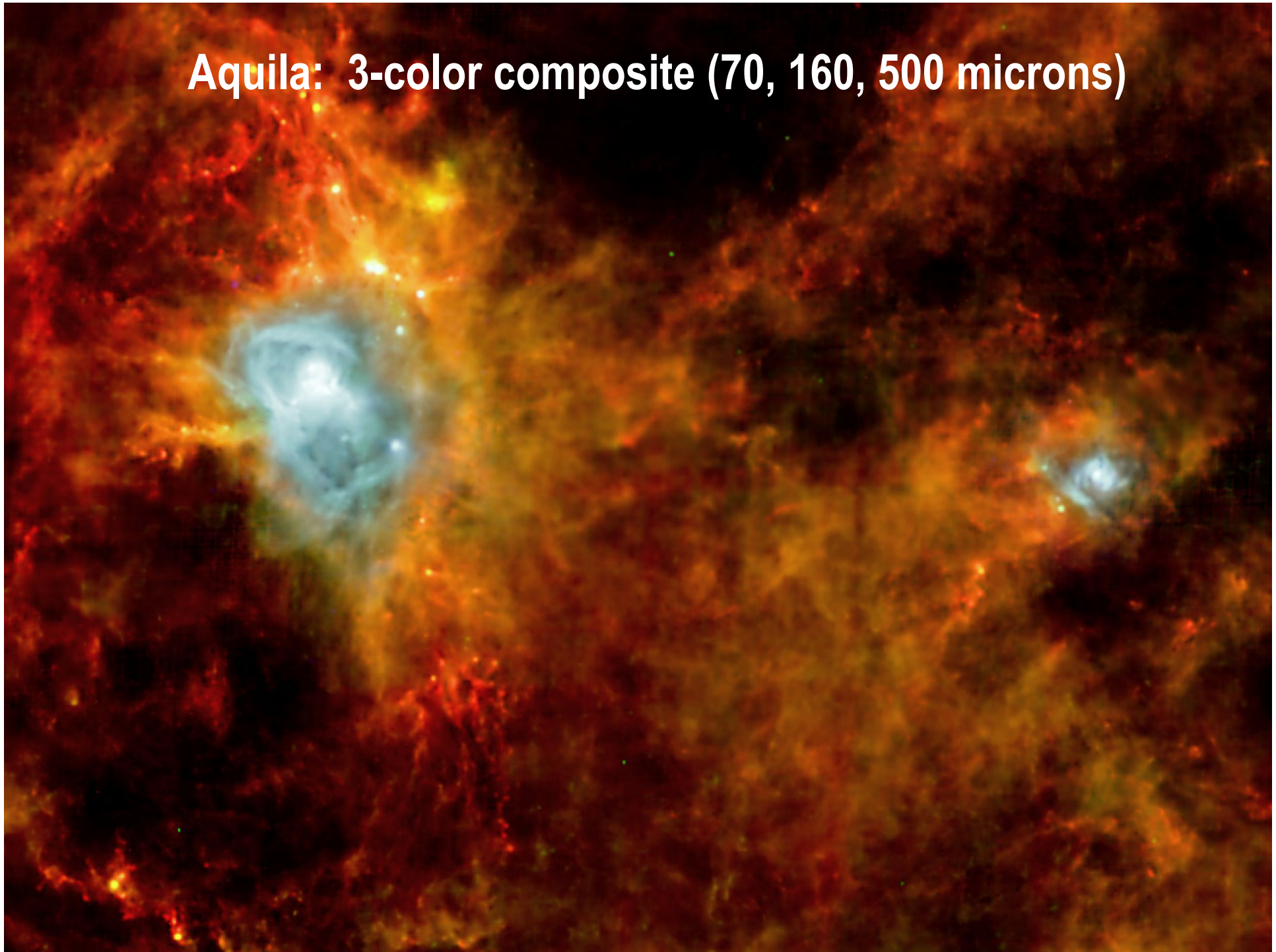
L1157 mm

10⁴ AU



Water traces violent interaction between young star and its parent cloud

Aquila: 3-color composite (70, 160, 500 microns)



Extended Emission
(very faint)

NGC4435

NGC4402

NGC4438

NGC4406 (M86)

Optical image
(Credit: Sloan Digital Sky Survey)



Extended Emission
(very faint)

SPIRE 250-micron
image

Extended emission

NGC4435

NGC4402

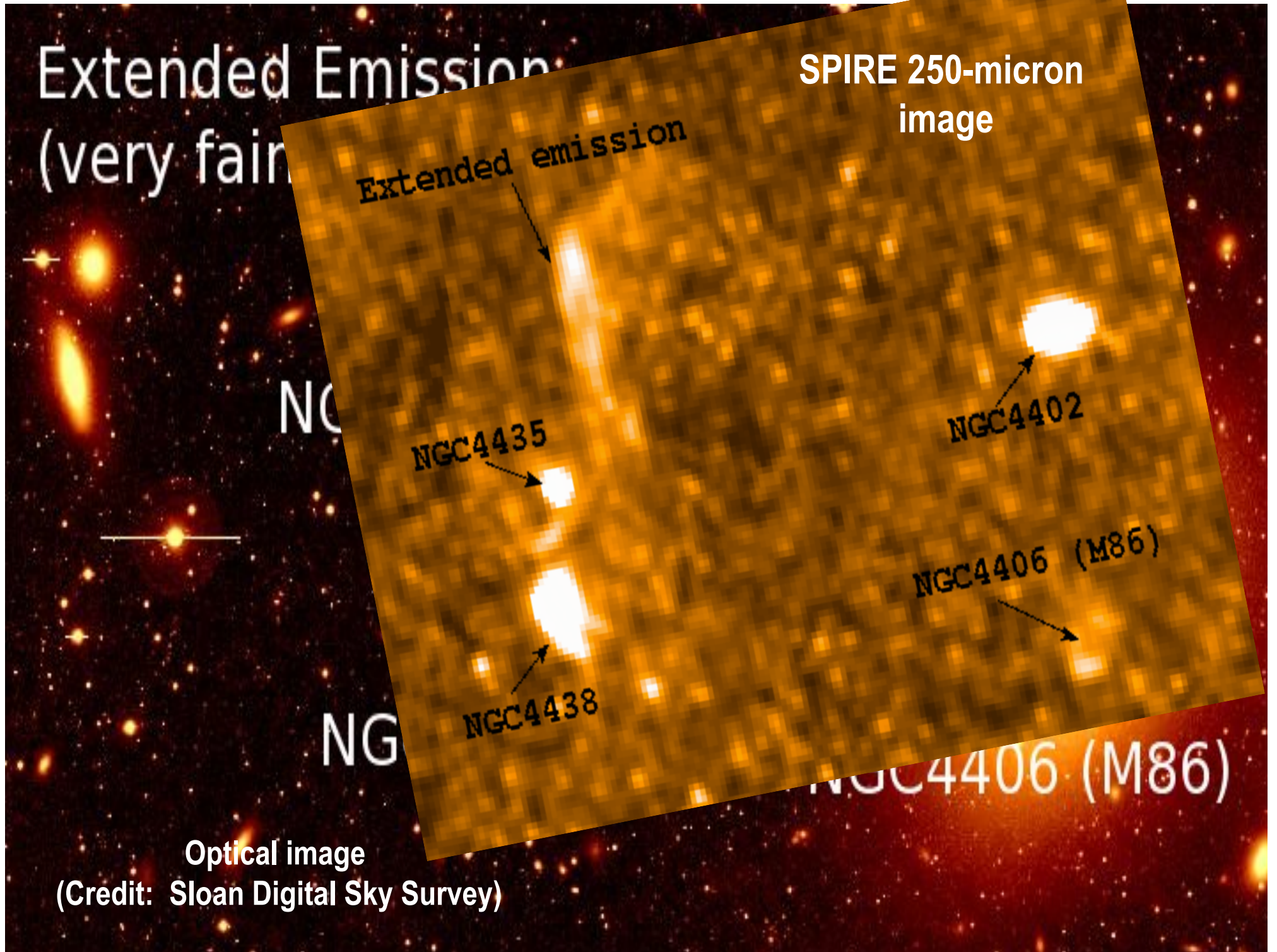
NGC4406 (M86)

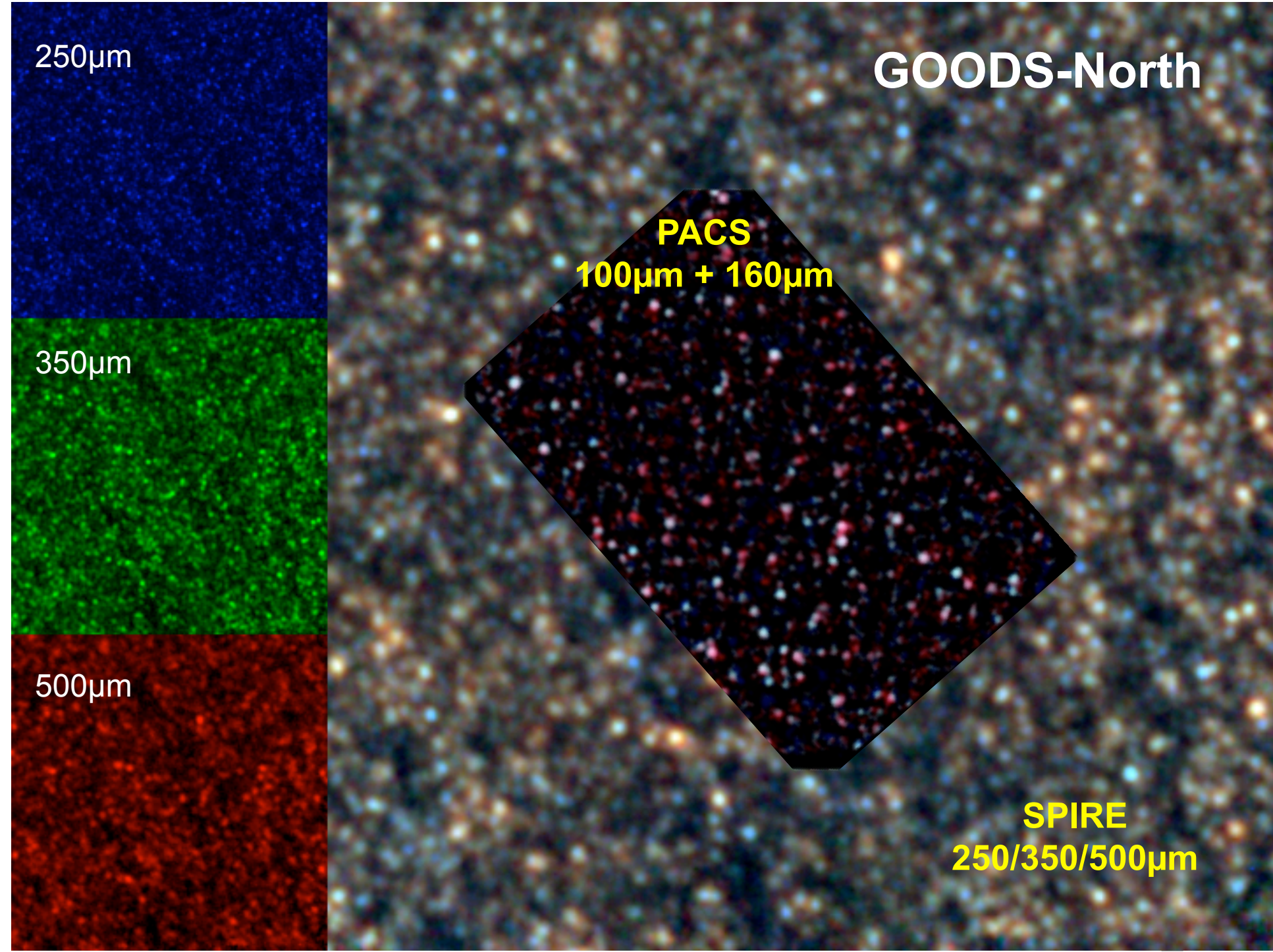
NGC4438

NGC4406 (M86)

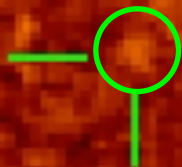
Optical image

(Credit: Sloan Digital Sky Survey)

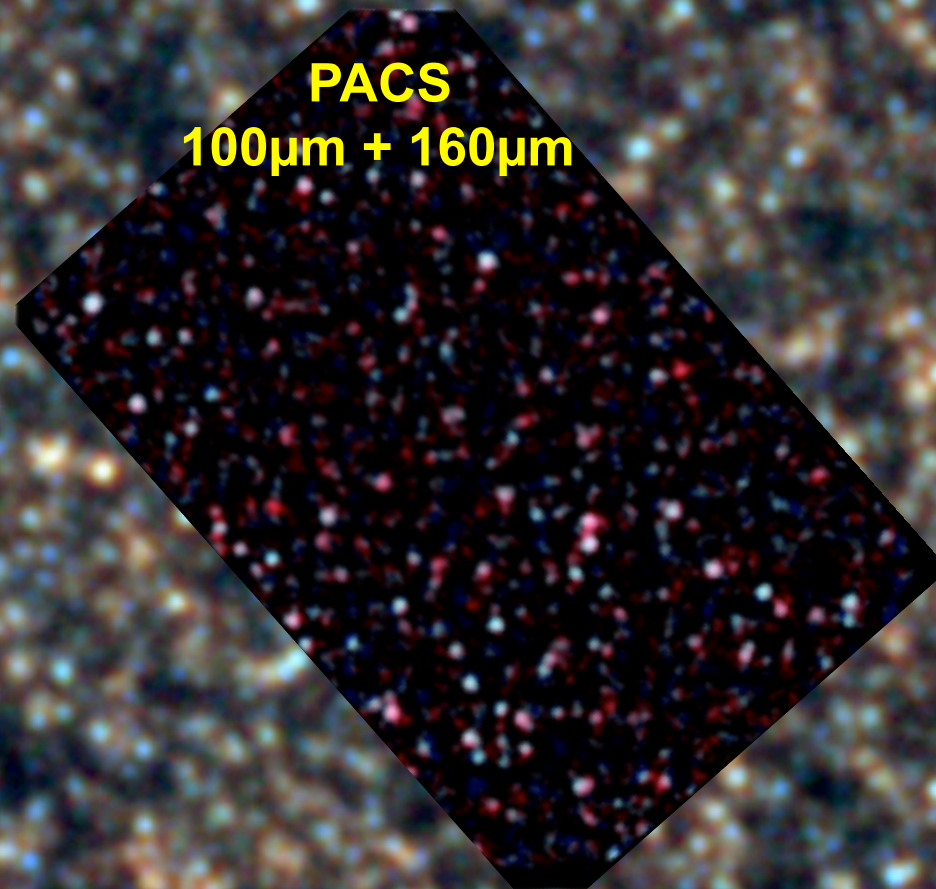




PACS
100 μ m



PACS
100 μ m + 160 μ m



The highest redshift quasar known: $z=6.42$