

# SPiCA

Space Infrared Telescope for Cosmology and Astrophysics

P4-010

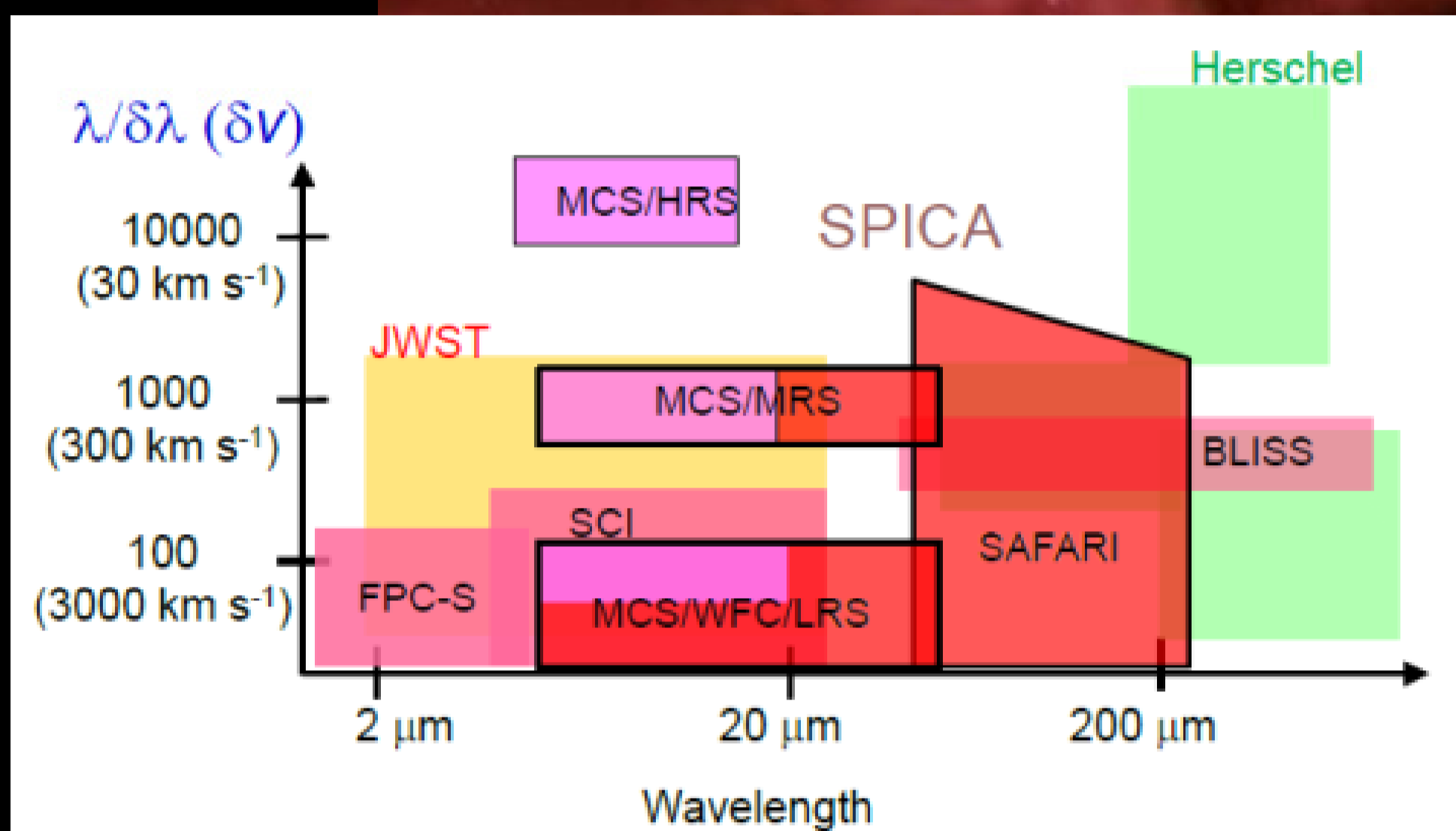
Hideo Matsuhara, Takashi Ichikawa, & SPiCA pre-project Team / Science WG

## SPiCA Specifications

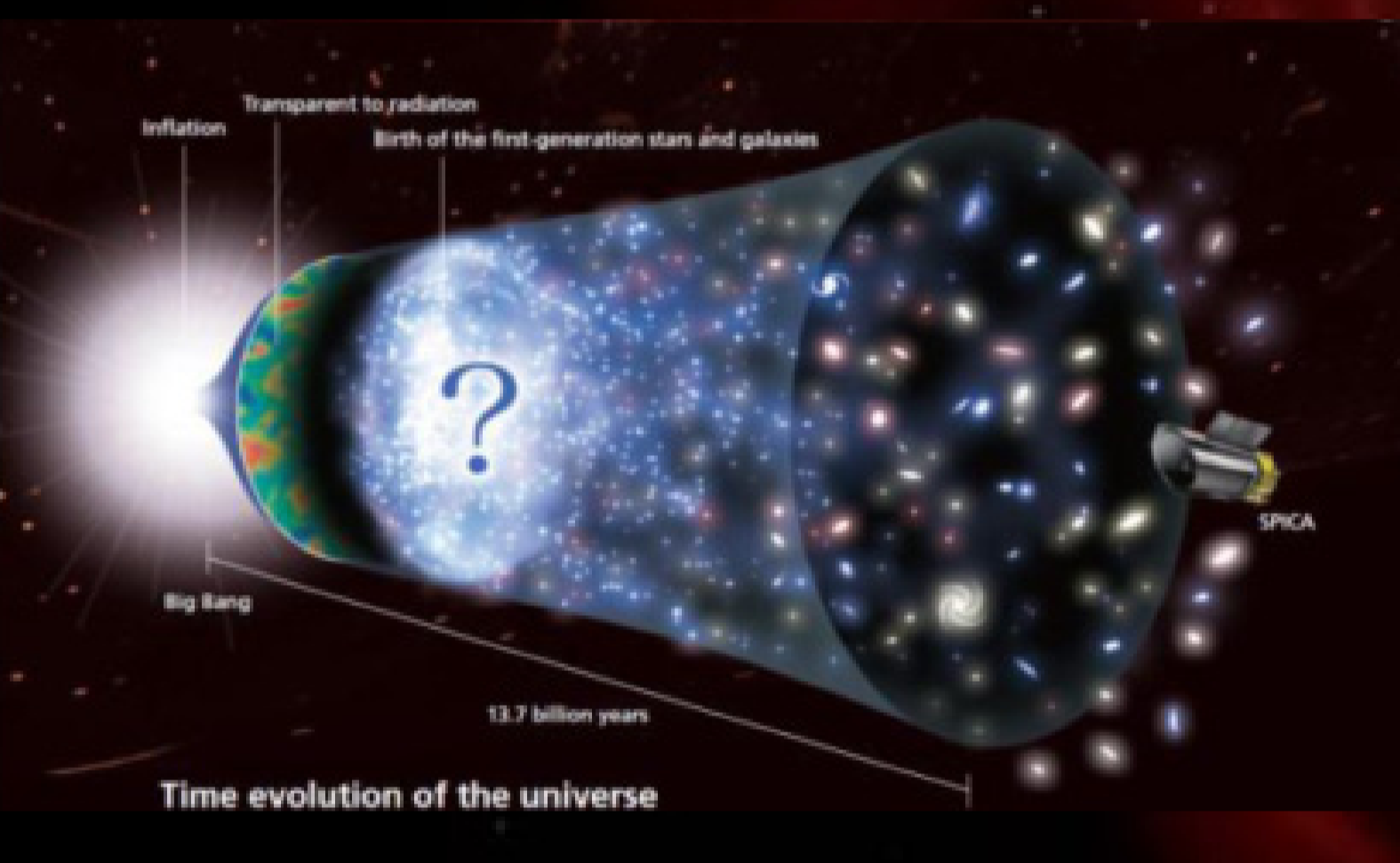
- Mission Goals: Revealing the origins of planets and galaxies through mid-to far-infrared observations
- Telescope dia. 3-m class (3.2m in the current design)
- Telescope temp. <6K
- Core Wavelength: 5-210 $\mu\text{m}$
- Total mass 3.7t
- Orbit: Halo orbit around libration point S-E L2
- Launch : early 2020s (H-IIA-204)

## SPiCA, a Cool Mission

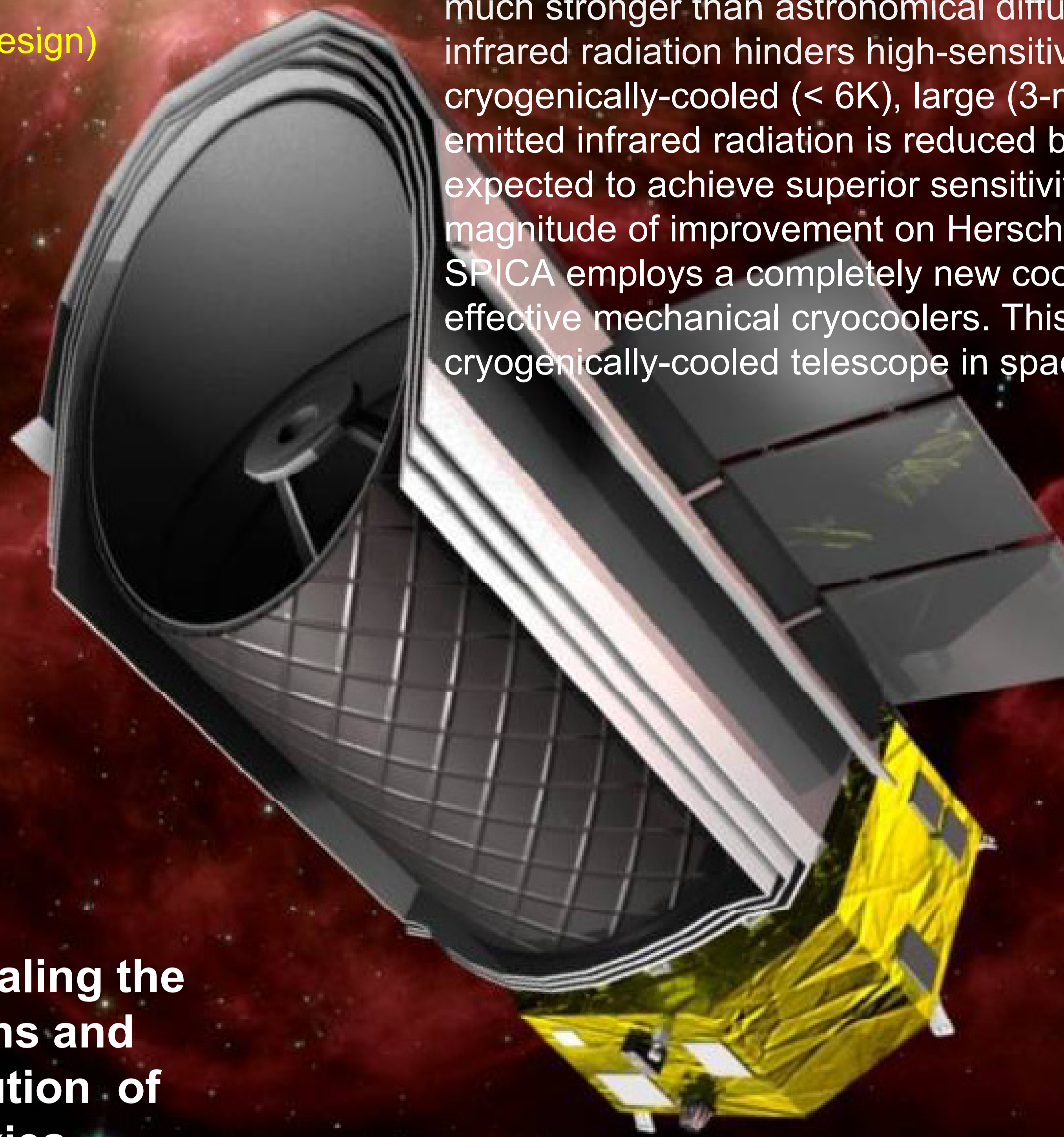
Warm telescopes ( $\sim 20$  K) on previous missions emit infrared radiation much stronger than astronomical diffuse radiation. This self-emitted infrared radiation hinders high-sensitivity infrared observations. With a cryogenically-cooled ( $< 6$ K), large (3-m class) telescope on SPiCA, self-emitted infrared radiation is reduced by a factor of a million: SPiCA is expected to achieve superior sensitivity, more than an order of magnitude of improvement on Herschel. SPiCA employs a completely new cooling system, which utilizes effective mechanical cryocoolers. This technology enables a large, cryogenically-cooled telescope in space.



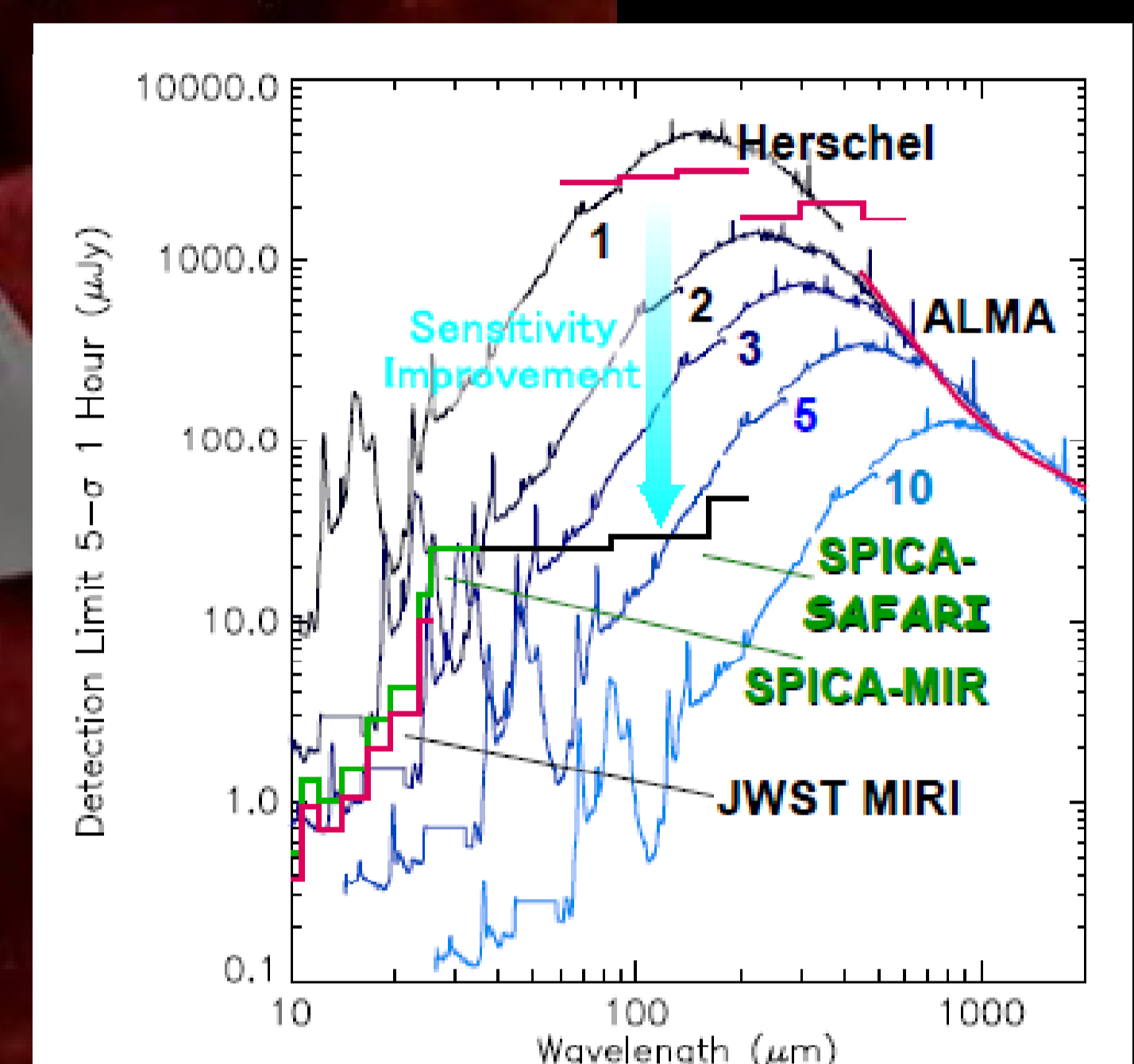
## SPiCA Focal Plane Instruments



Revealing the origins and evolution of galaxies



The recipe for planetary systems



## Huge Gain of Sensitivity



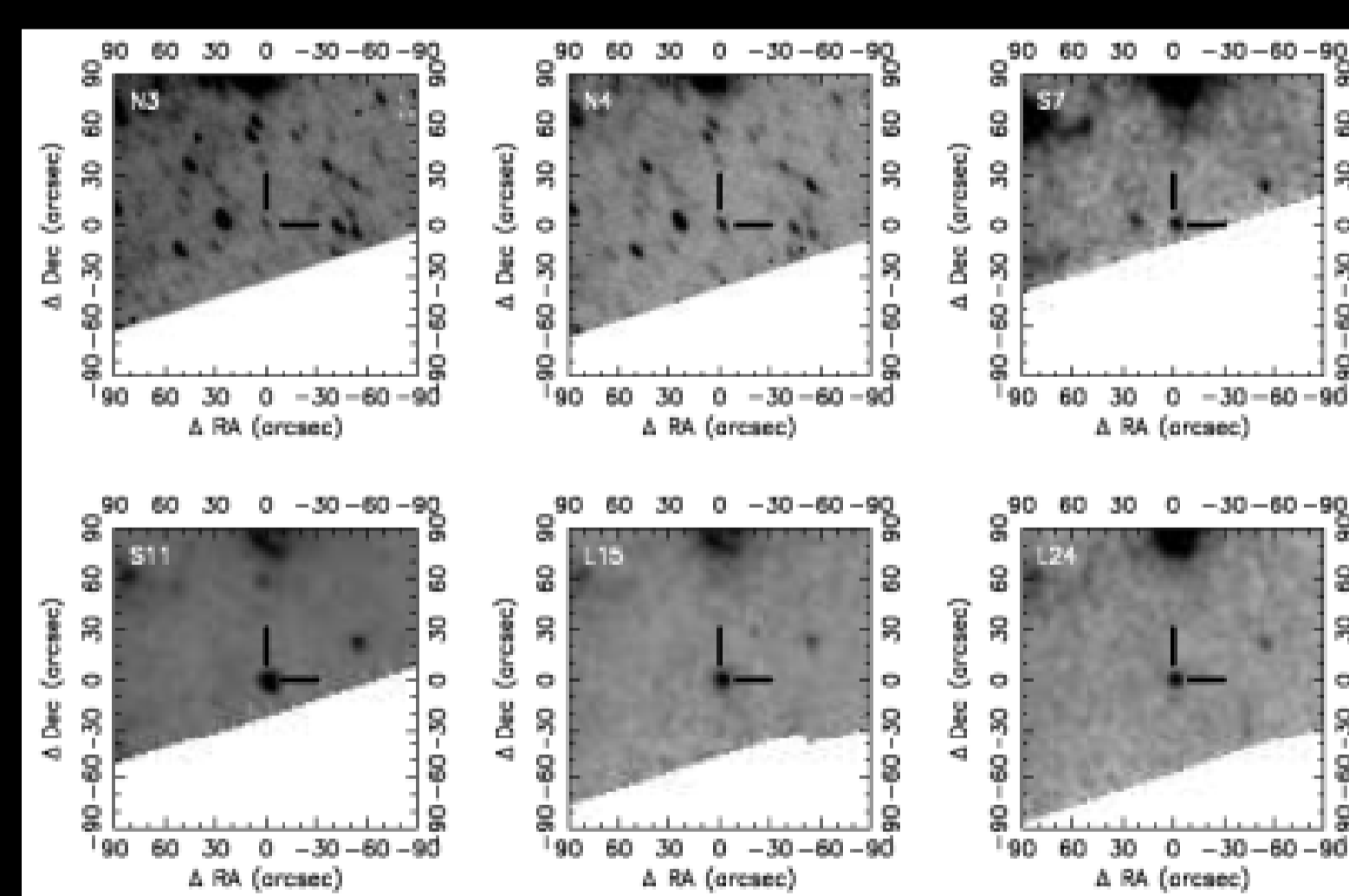
## Scientific Objectives : Recent Progress

See also poster P4-016 (SPiCA / SAFARI)

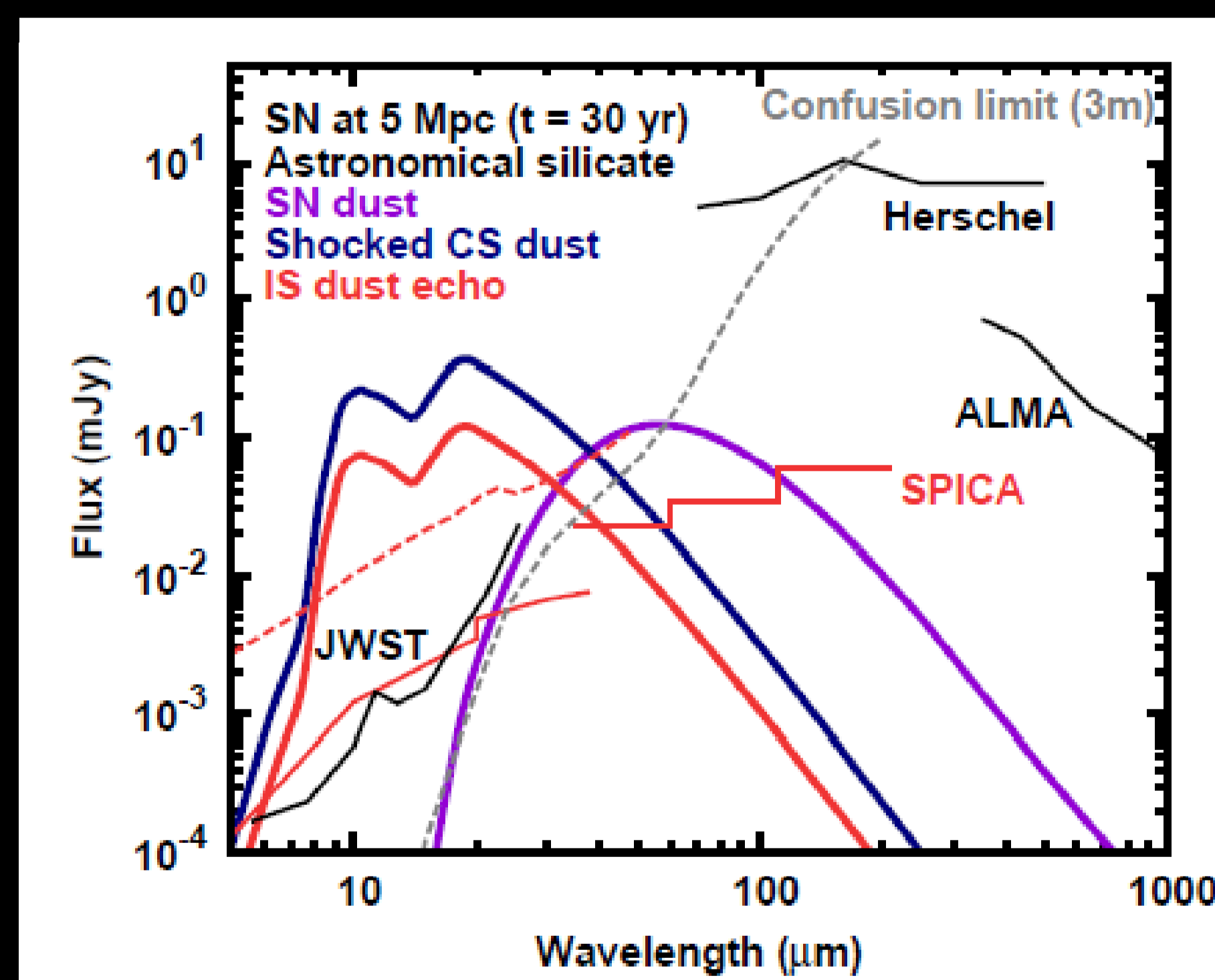
## Search for dust formation in the transitional phase SNe

Tanaka, M. et al. submitted (2012)

Observations of SNe at the transitional phase with SPiCA will fill the gap of IR observations of SNe with the age of 10 – 100 years, and give a new opportunity to study the circumstellar and interstellar environments of the progenitor, and possibly dust formation in SNe.



AKARI images of SN 1978K in NGC 1313. The shocked circumstellar (CS) dust? Or newly formed dust in the outer shell?



## Power of SPiCA!!

## Revealing metallicity of dust obscured high-z galaxies

Nagao et al. A&A 526, A149 (2011)

Useful diagnostic technique with far-IR fine structure lines is proposed. SPiCA is only capable to perform the diagnostics of the dust obscured galaxies at  $z \sim 1$  or more.

