



Integral Field Spectrographs

Wang Zhenyi

Department of Astronomy, Beijing Normal University

Sections:

[What] is IFS

[Why] is there IFS

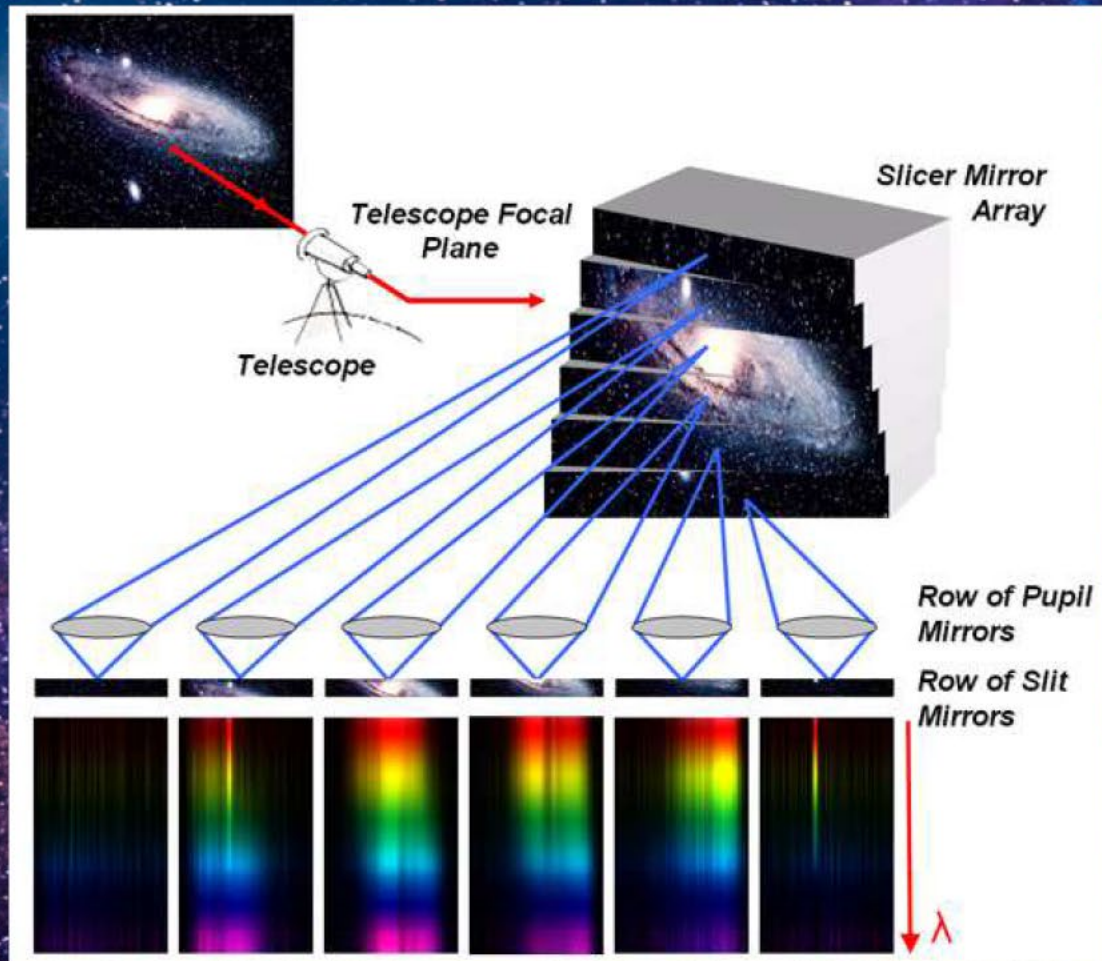
[How] to use IFS

What is IFS?

Definition:

Integral field spectrographs are instruments that allow you to **gather spectra** of the sky over a **two-dimensional field-of-view**

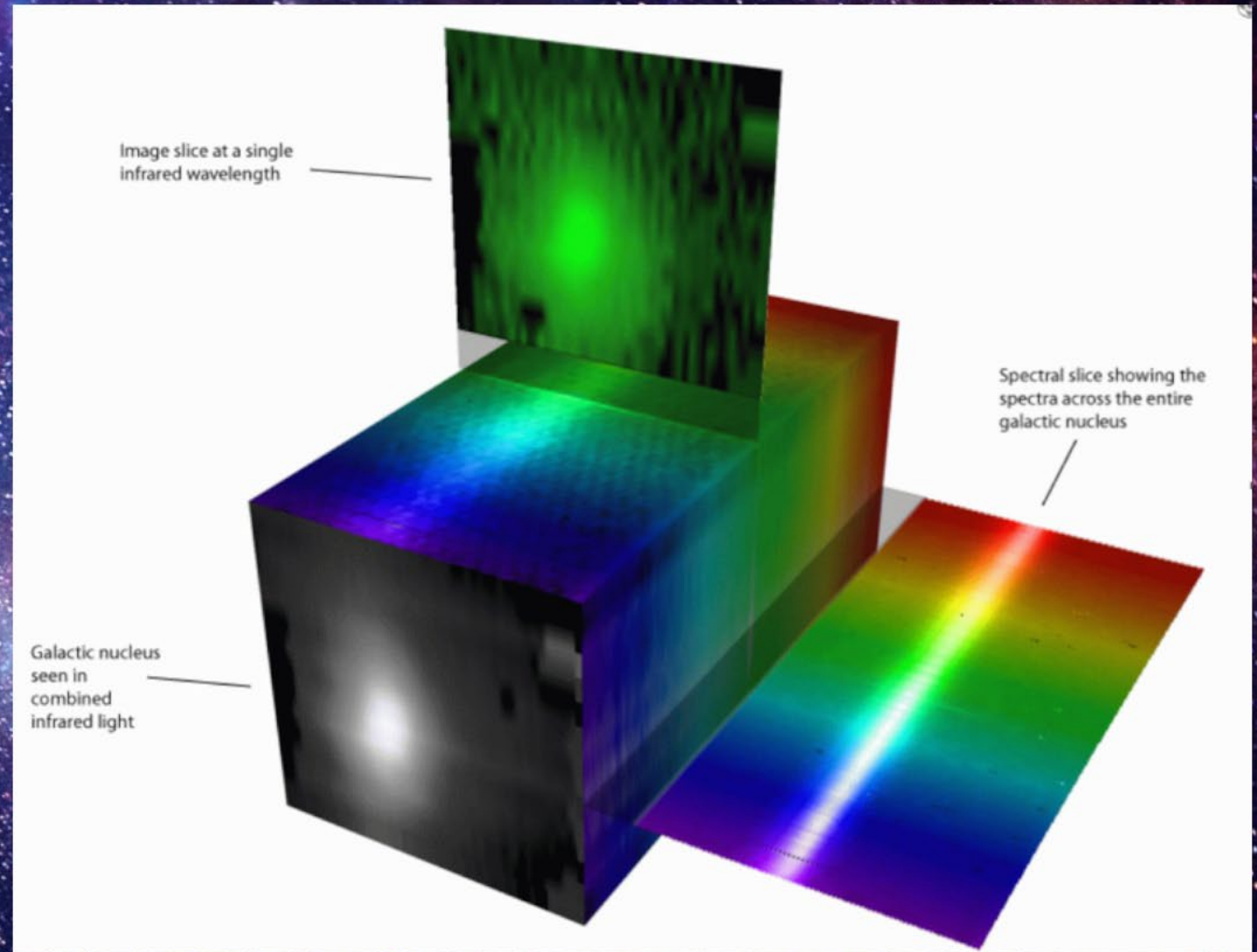
What is IFS?



IFS can be seen as a **combination** of **telescope** and **spectrometer**, it has the ability to obtain image and spectral information at the same time.

What is IFS?

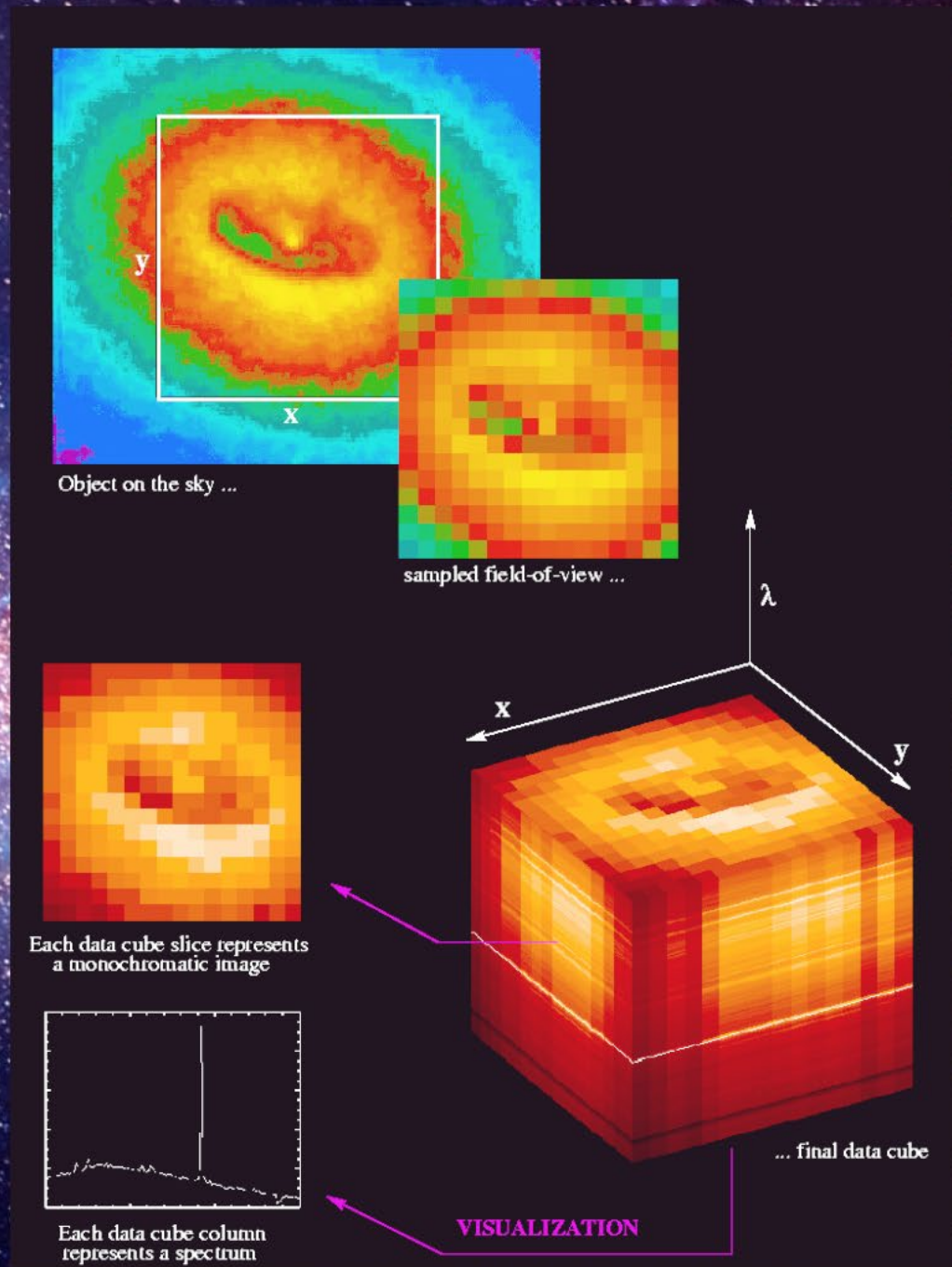
DATA-CUBE



Credit: Stephen Todd (ROE) and Douglas

What is IFS?

Principle



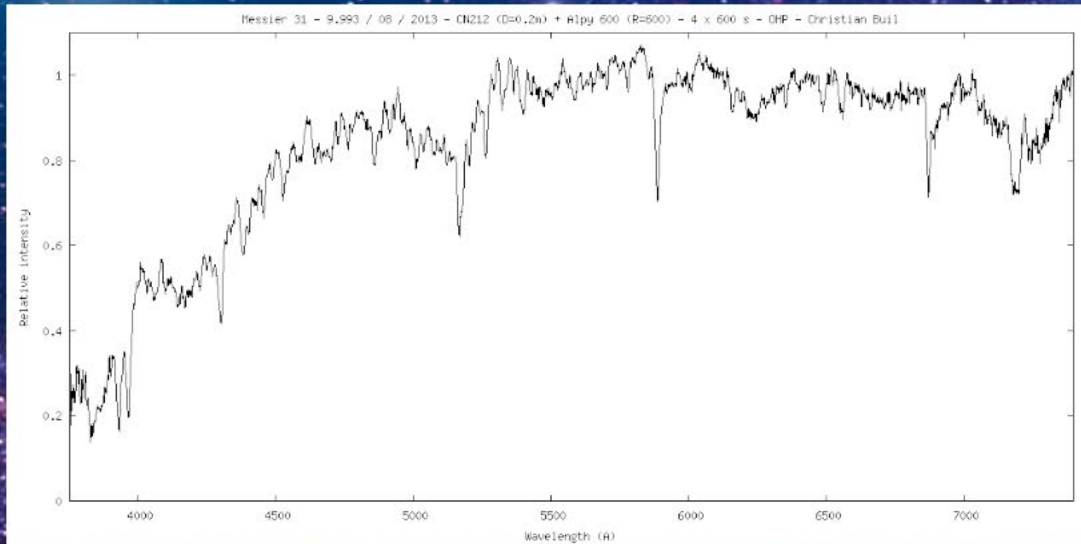
Credit: M. Roth 2002



Why is there IFS?

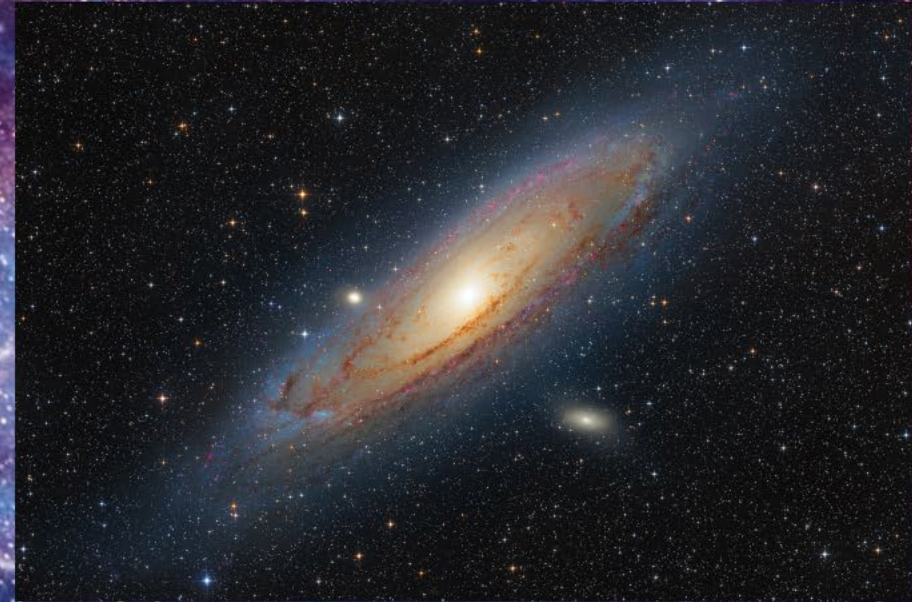
Why is there IFS?

Astronomer's ambition



spectrum^[2]

&



image

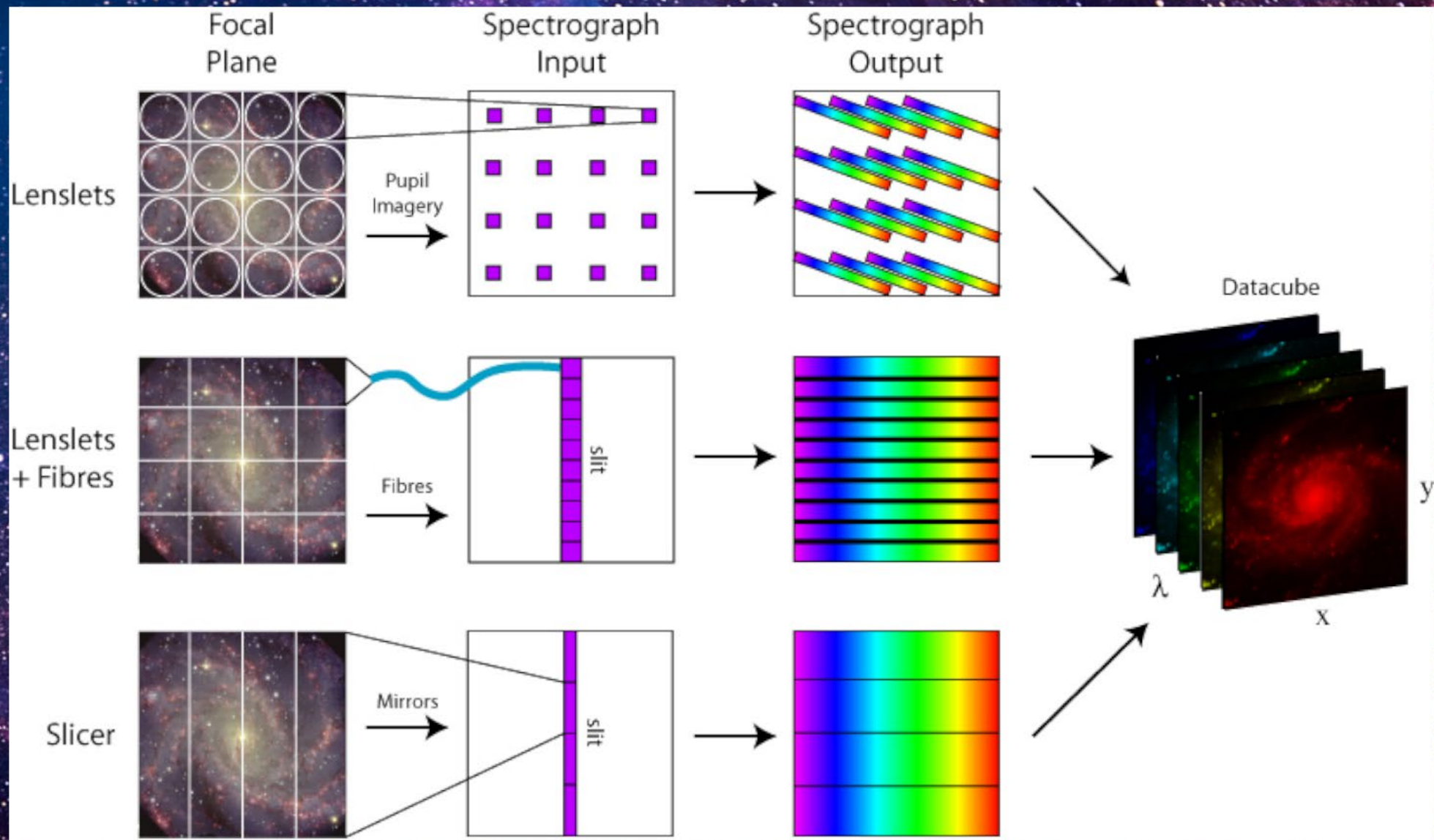
I want both of them in using one device!

[2]<https://thecuriousastronomer.wordpress.com/tag/galaxy-spectrum/>



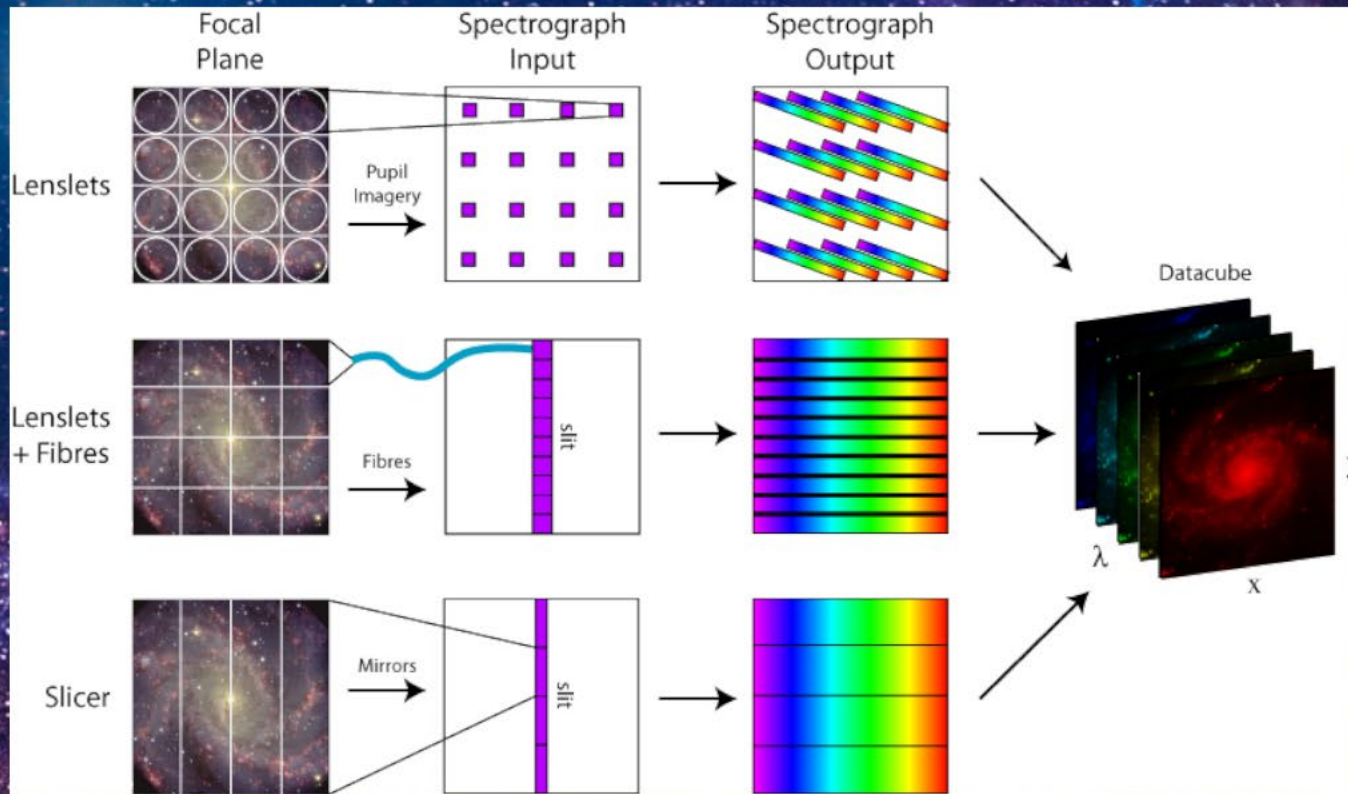
How to use IFS? Applications

Application



Credit: M. Westmoquette, adapted from Allington-Smith et al. 1998

Application



Lenslet array:

CFHT Tiger, WHT SAURON^[3]

Fibres (with or without lenslets):

without lenslets: WHT Integral;

WIYN SparsePak; with lenslets:

Gemini GMOS-IFU^{[4][5]}

Image-slicer:

VLT SINFONI, Gemini NIFS^[1]

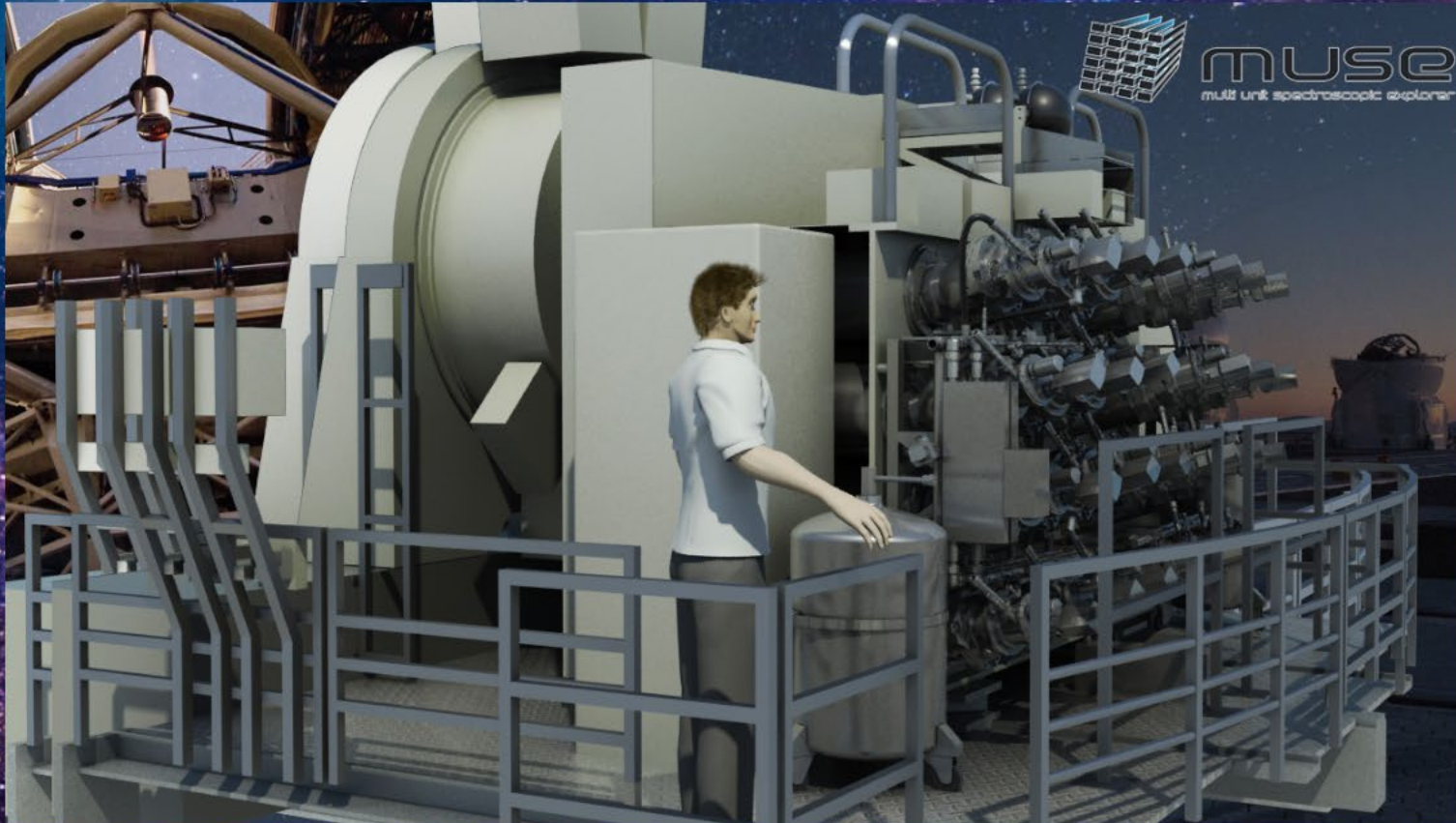
[3]<https://ui.adsabs.harvard.edu/abs/1995A%26AS..113..347B>

[4]<https://ui.adsabs.harvard.edu/abs/1988ASPC...3..113B>

[5]<https://ui.adsabs.harvard.edu/abs/1997SPIE.2871.1284A>

[1]<https://arxiv.org/abs/physics/0512002v1>

Application



MUSE telescope by ESO



Muse the goddess
(Uranis)

References:

Documents:

- [1] [An original image slicer designed for Integral Field Spectroscopy with NIRSpec/JSWT](#) [EB/OL]
- [2] [the curious astronomer](#)[EB/OL]
- [3] [3D spectrography at high spatial resolution. I. Concept and realization of the integral field spectrograph TIGER.](#) [EB/OL]
- [4] [DensePak and spectral imaging with fiber optics.](#) [EB/OL]
- [5] [Integral field spectroscopy with the Gemini Multiobject Spectrographs](#)[EB/OL]

Videos:

[New MUSE Instrument Sees Farther Than Hubble Telescope](#)
[MUSE views the Orion Nebula](#)
[MUSE, The Cosmic Time Machine](#)



Thanks for your attention

I would appreciate your criticism