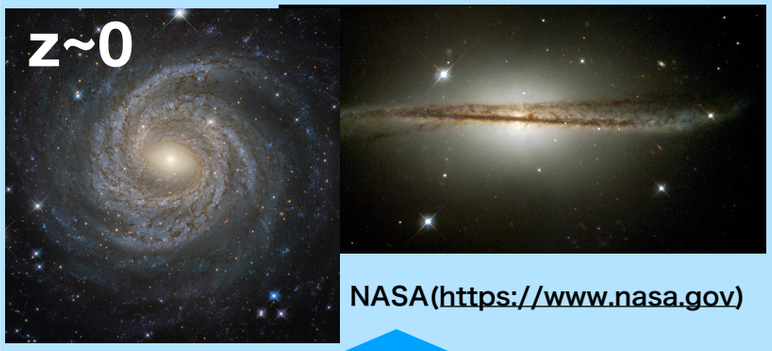
The estimation method of atmospheric turbulence profile using adaptive optics system

Hajime Ogane (astronomy M2)

Overall picture of my research

1.Science motivation : “Morphological evolution of Star Forming Galaxies”

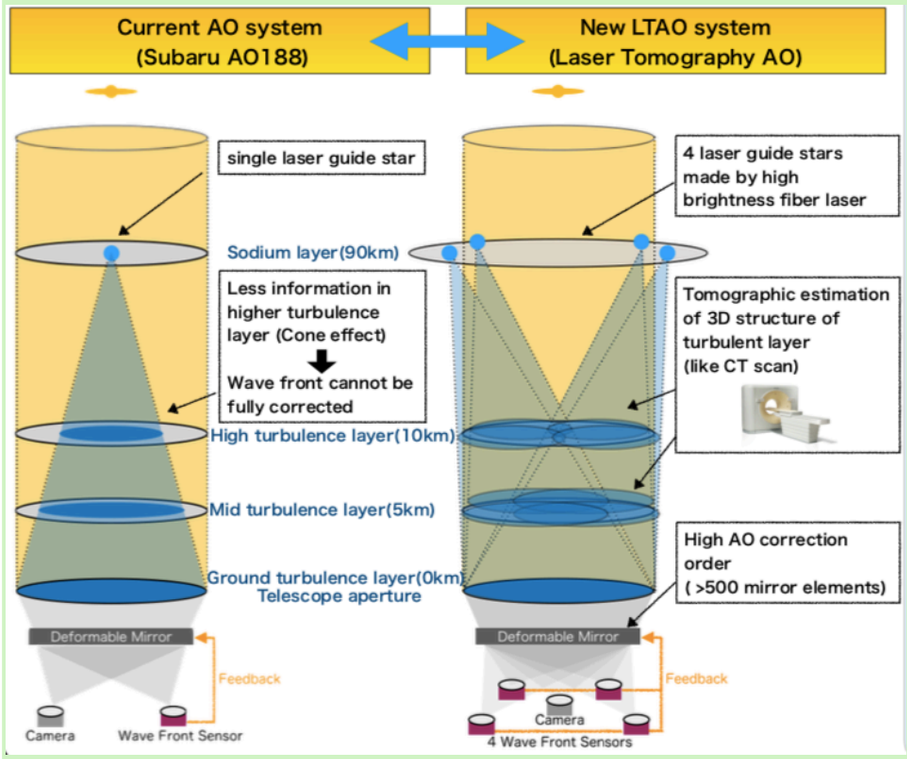


NASA(https://www.nasa.gov)

Large morphological differences!

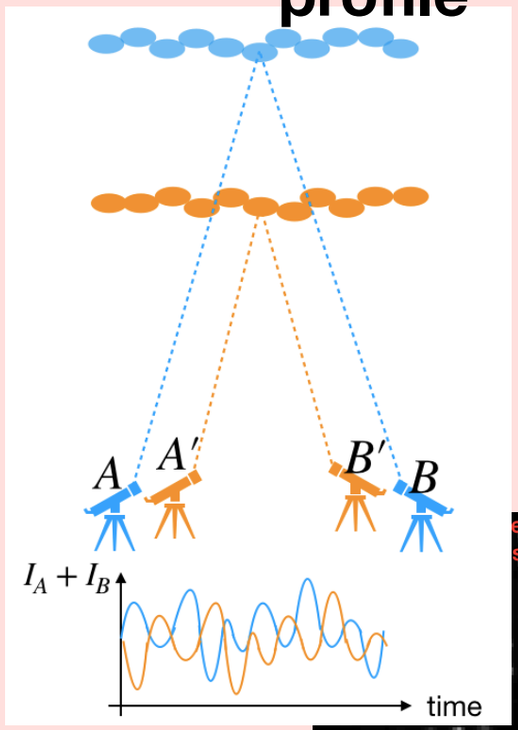
- The morphology of SFGs have drastically changed between z~3 and z~0.
- According to some cosmological simulations, z~1.5 is the critical epoch of changing.

2.Method : “Laser Tomography Adaptive Optics System”



- Adaptive Optics(AO) is one of the essential techniques for getting highly resolved images of galaxies.
- In order to resolve SFGs in z~1.5, we need LTAO system.

3.Essential Technology : “Estimation method of atmospheric turbulence profile”



- By using many small telescopes with various separations, we can estimate the strength of atmospheric turbulence for each altitudes.

Research goal in GPPU term

M2

2019/10

- Development of atmospheric turbulence profile estimation method using wavefront sensor data obtained @Sendai → Master thesis

2020/03

- Evaluation experiment of LTAO wavefront sensor prototype @Subaru telescope (2020/03)

2020/04

D1

- Evaluation of atmospheric turbulence profile estimation method using wavefront sensor data obtained @Subaru telescope

2021/04

D2

- System construction of atmospheric turbulence estimation method
- Evaluation experiment of LTAO wavefront sensor @Subaru telescope (2022/03)

2022/04

D3

- Considering the gain of application the method to TMT-class telescope using simulation method

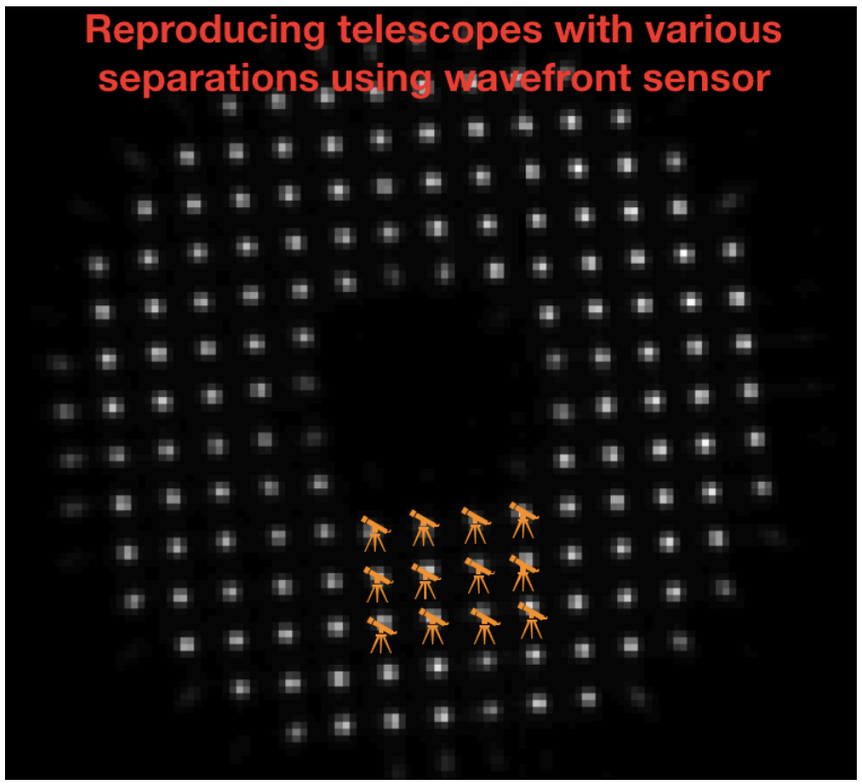
2023/03

Current Position

M2

2019/10

- Development of atmospheric turbulence profile estimation method using wavefront sensor data obtained @Sendai → Master thesis



2020/03

2020/04

D1

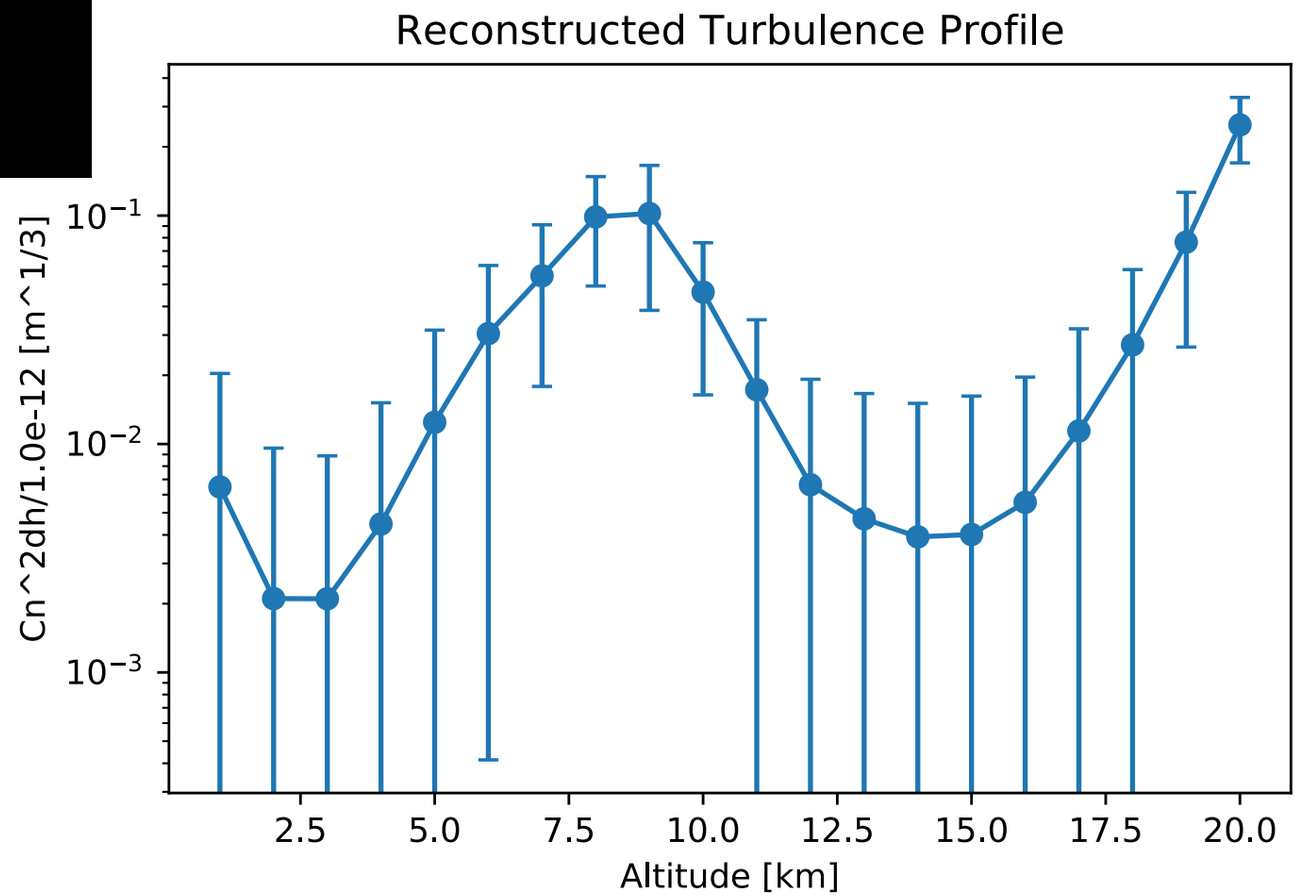
2021/04

D2

2022/04

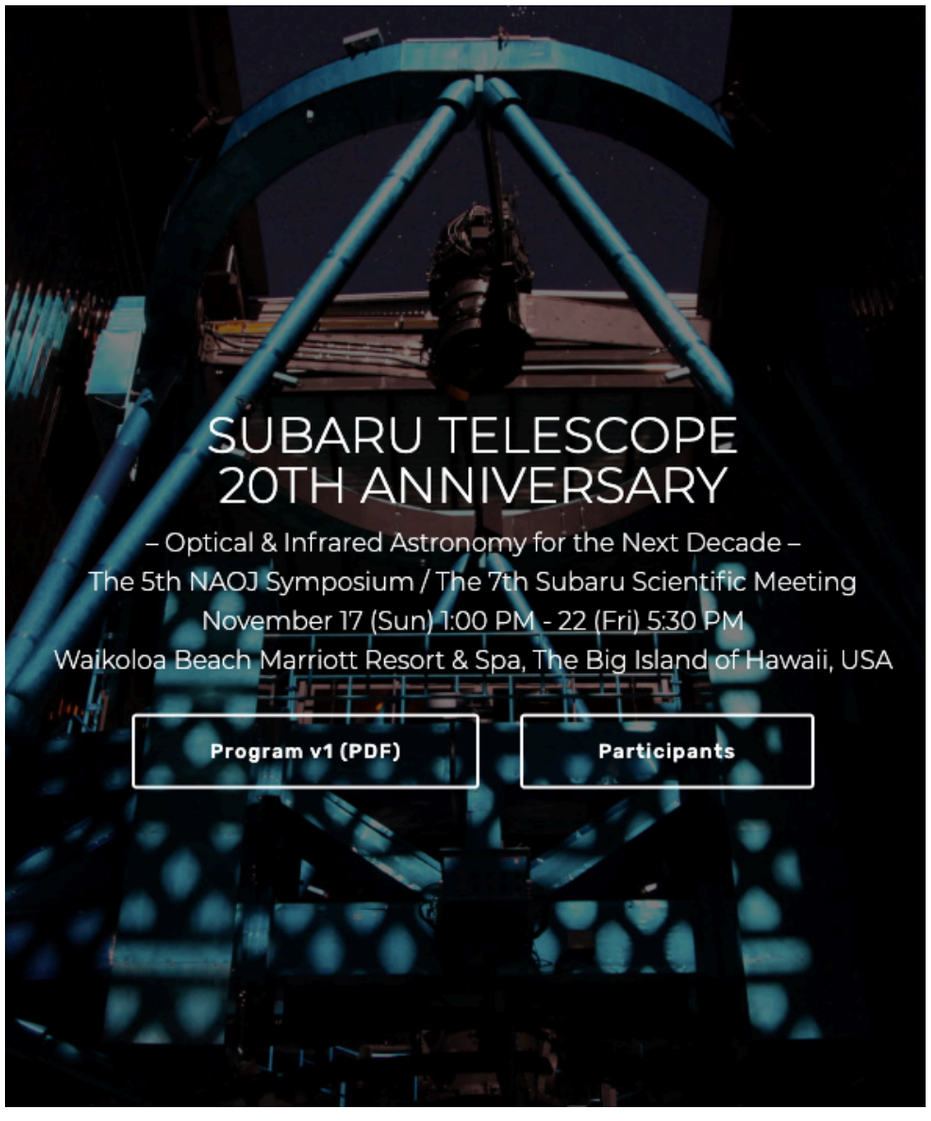
D3

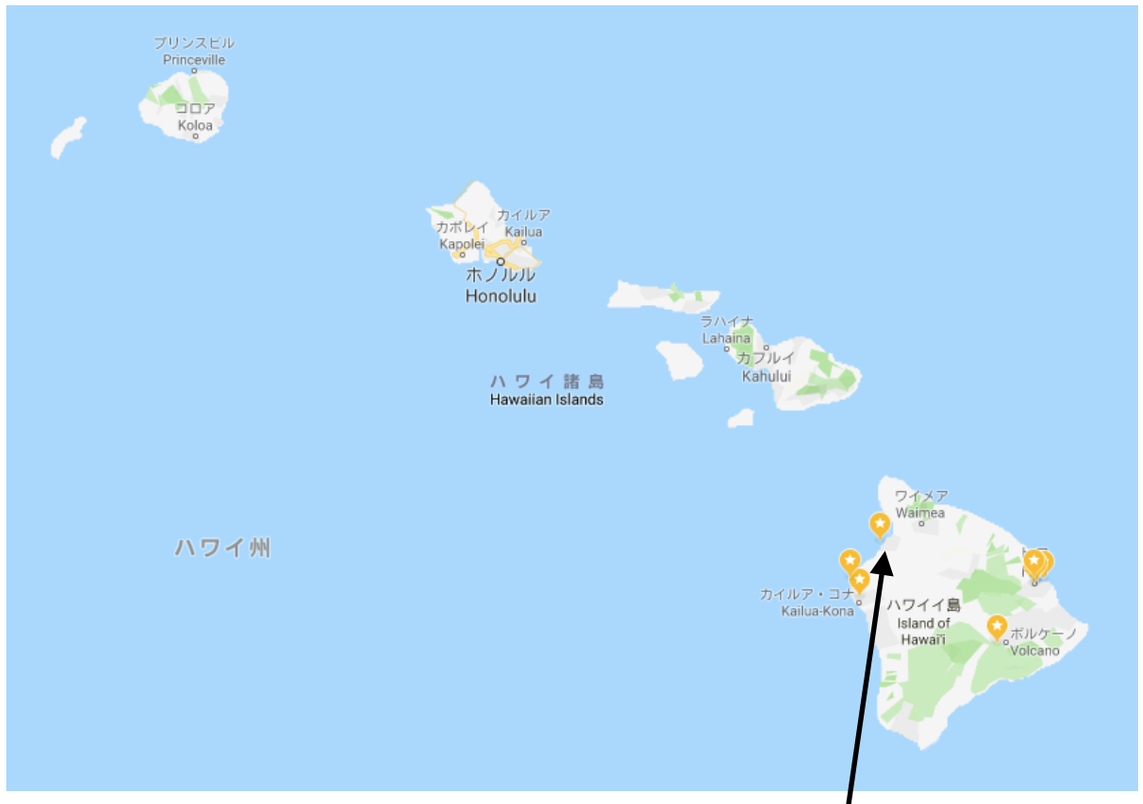
2023/03



Future plan of studying abroad

- 2019/11 : Subaru telescope 20th anniversary meeting @Hawaii
  - Poster presentation “ULTIMATE-START III : Atmospheric turbulence profiling for a tomography AO”





Waikoloa village