

ASIAA has maintained a long-standing collaboration with CFHT for over 20 years, this partnership has been pivotal to advancing optical and infrared (OIR) astronomy in Taiwan. CFHT's time offers consistent access to cutting-edge instruments for Taiwanese astronomers, supporting a wide range of scientific research. The various instrumentation collaboration with CFHT helps ASIAA to train their technical staff and to grow the instrumentation capability in OIR wavelengths.

## CFHT Instrumentation

Through our collaboration on CFHT instrumentation, ASIAA's OIR lab has acquired expertise in a range of critical areas, including detector control electronics, OIR detector characterization, near-IR data processing pipelines, high-speed signal control, guiding systems, and fluid dynamics. These projects have also deepened our understanding of cryogenic opto-mechanical systems and high-precision temperature control. Together, these experiences have laid a solid foundation for our OIR instrumentation capabilities.



### WIRCam

WIRCam contains 4 2048x2048 pixel HAWAII2-RG and covers a 20x20 arcminute field-of-view with a sampling of 0.3 arcsecond per pixel. It represented one of the largest astronomical mosaic of infrared detectors at the time of commissioning. We have joined the design of WIRCam readout electronics and CCD testing, as well as software pipeline.



### SPIRou

SPIRou is a near-infrared spectropolarimeter, optimized for high-precision radial velocity measurement. It is embedded in a cryogenic vessel cooled down to a temperature of 80 K and stabilized at a precision below 2 mK. ASIAA had contributed to the Tip-tilt and guiding camera system.

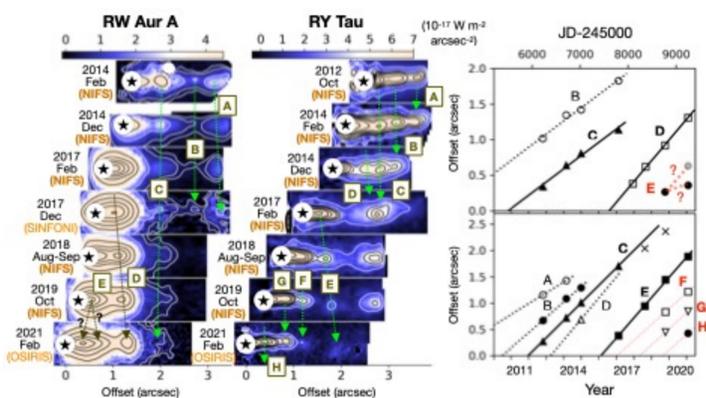


### Dome Venting

As an effort to improve delivered image quality in a cost-effective manner, a dome venting project was initiated to eliminate local contributions to 'seeing' that exist along the optical path and arise to a large extent due to temperature gradients throughout the dome volume. ASIAA has also joined the wind tunnel experiments to understand airflow on top of Mauna Kea.

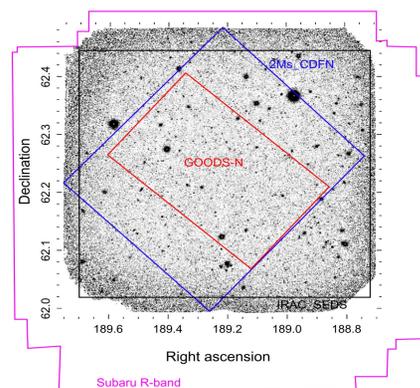
## Selected Science Results

We have access to the Canada-France-Hawaii Telescope (CFHT), which boasts top-tier instruments like MegaCam, WIRCam, ESPaDOnS, SITELLE and SPIRou. Our members employ these tools for diverse research, including photometric redshifts of distant galaxies, galaxy clusters, afterglow hunting for gamma-ray bursts, star formation studies, and investigations into brown dwarfs and triggered star formation.

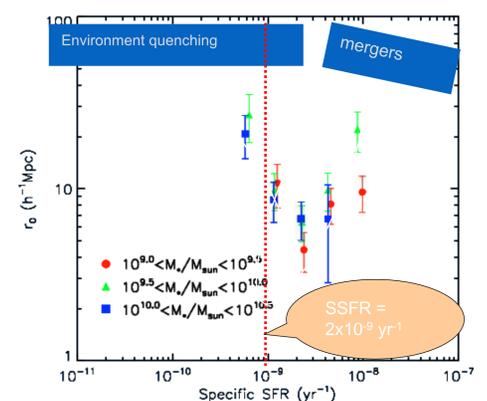


## Star Formation

Understanding jet launching from young stars with long term monitoring effort with ESPaDOnS. (Chou, Takami + 2013; Takami, Wei + 2016; Takami + 2020)



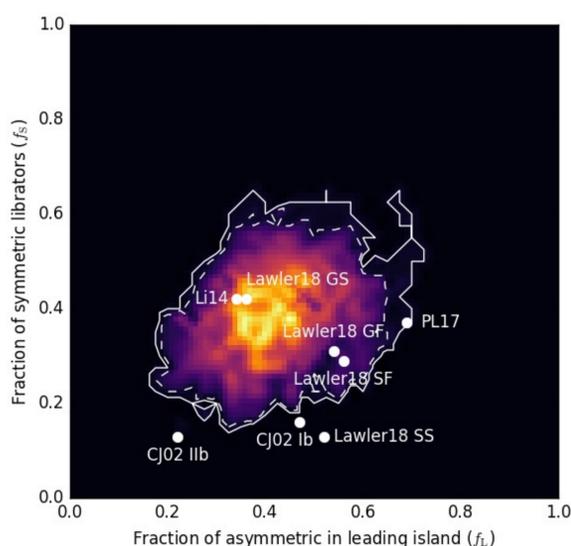
L. Lin+ 2012, ApJ  
L.-T. Hsu, L. Lin+ 2019, ApJ



L. Lin et al. 2012

## Extra-Galactic

Understand the galaxy evolution through multi-wavelength surveys W.-H. Wang & S. Foucaud led the MUSUBI project to conduct a u-band survey in two HSC UD fields: L. Lin conducted a NIR imaging survey for the Extended GOODS-N field



## Solar System

With the CFHT large program OSSOS data, we constrain the ratio of leading and trailing 2:1 resonant TNOs, which is critical for planetary migration rate. (Y.-T. Chen et al. 2019)

## CFHT-data papers with author(s) affiliated with Taiwan

