



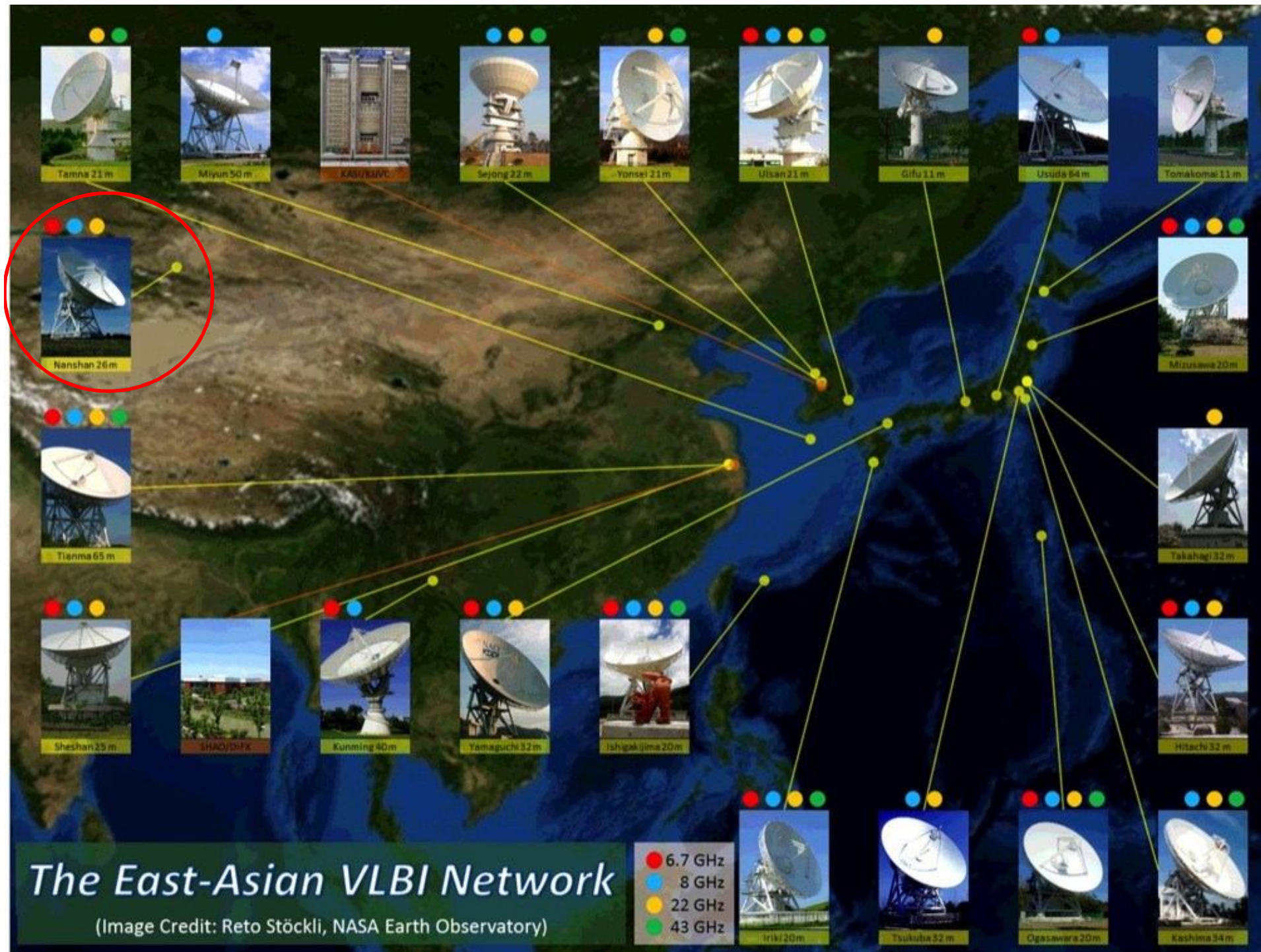
A brief Introduction to the NSRT and the SMMAN program

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The East-Asian VLBI Network

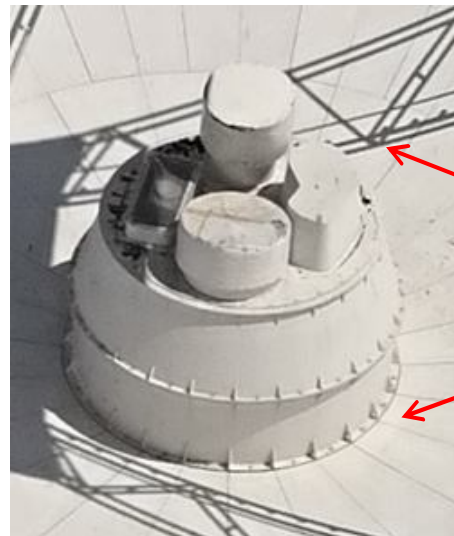
(Image Credit: Reto Stöckli, NASA Earth Observatory)

- 6.7 GHz
- 8 GHz
- 22 GHz
- 43 GHz

NanShan Radio Telescope (NSRT) – a glance of the reconstruction project

- Initially built in late 1993, reconstructed in the period of 2014 – 2015

Old NSRT	vs.	New NSRT
25-m	→	26-m
feed up-down	→	sub-reflector rotating
K-band	→	Q-band





Current configurations of the new NSRT

● Antenna

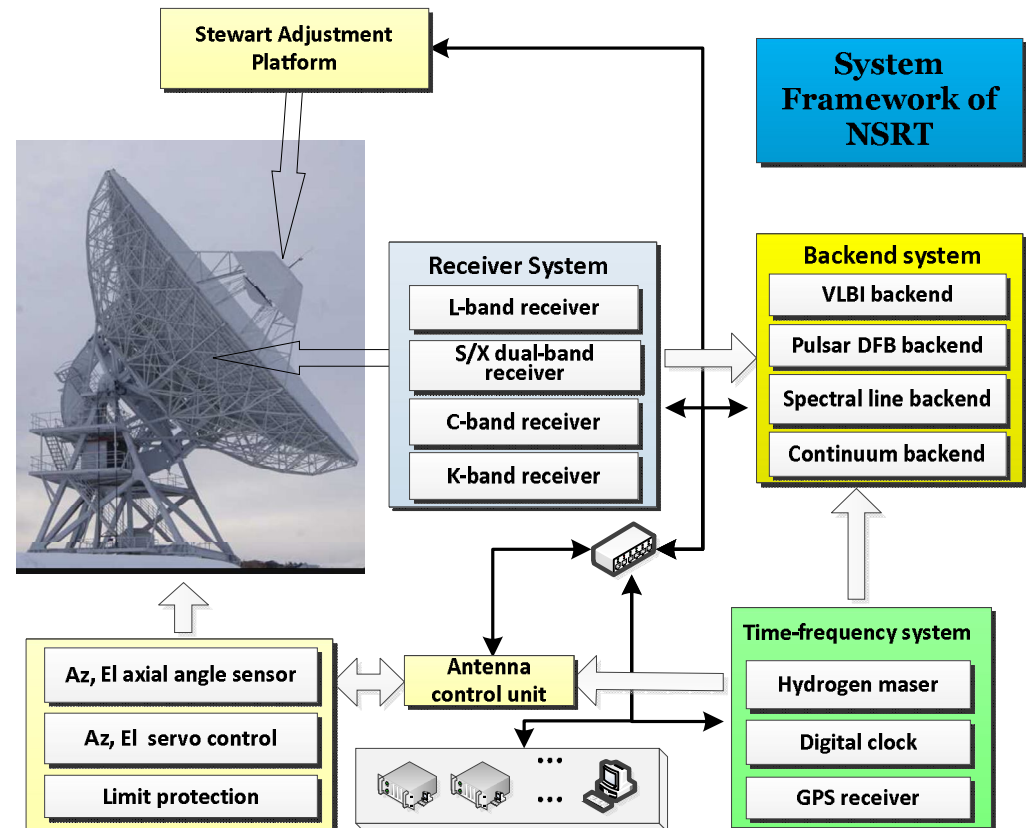
- Primary reflector: 26m, shaped Cass., surface RMS \sim 0.4mm
- Sub-reflector: Stewart platform, surface RMS \sim 0.1mm

● Receivers

- L, S/X, C & K bands working
- Q band receiver upcoming

● Backends

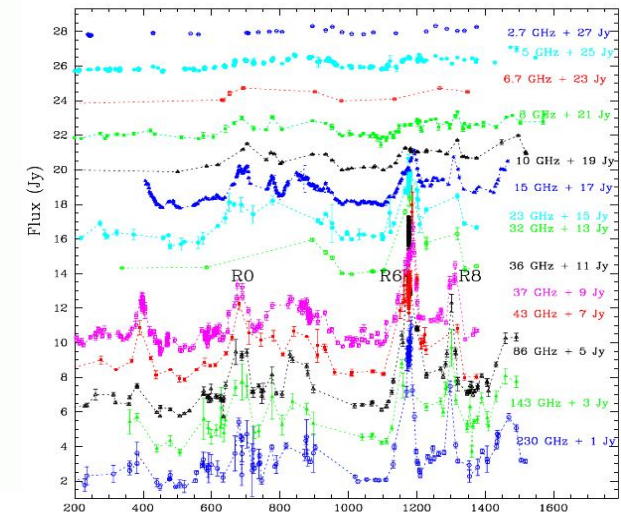
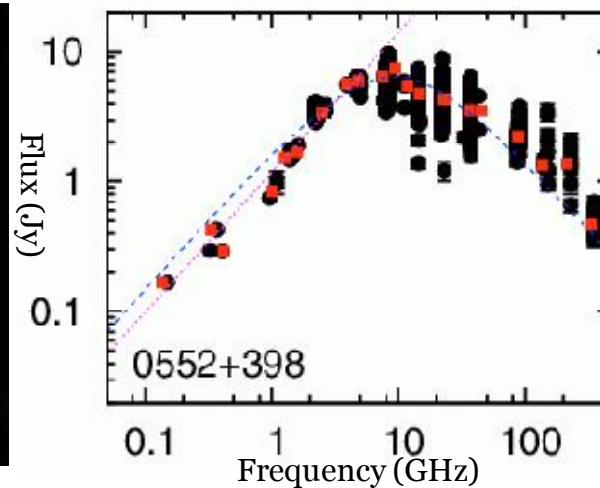
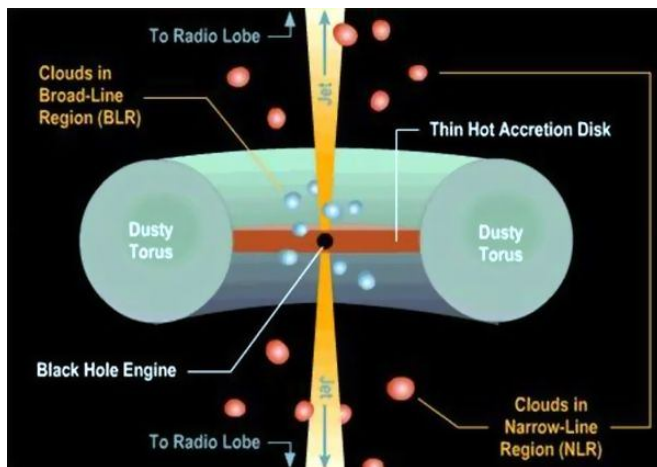
- VLBI, pulsar, spectral line & continuum backends





● Scientific Motivations

- Monitoring multi-wavelength radio flux of gamma-ray AGNs to enrich the data of other AGN monitoring programs (e.g. F-gamma, OVRO 15 GHz blazar monitoring, etc)
- Studying periodic radio flux variability and the evolution of spectral index
- Looking for possible correlations between radio band and gamma-ray to understand the emission mechanisms of AGN

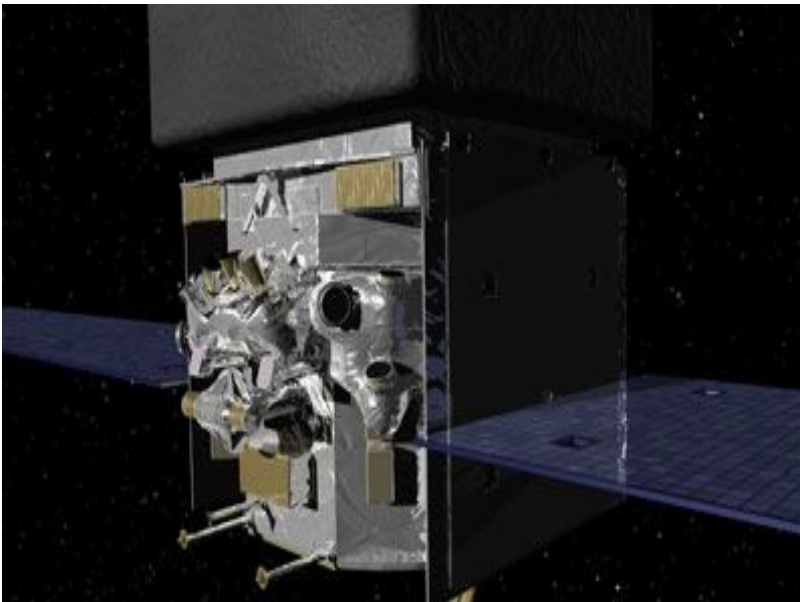




SMMAN: quasi-Simultaneous Multi-wavelength Monitoring of AGNs with NSRT

● *Monitoring Sample*

- Selected from Fermi-LAT 3FGL
- Selected criteria: Dec>0 deg & $S_{1.4}>300$ mJy
getting a candidate sample of 325 sources
- ~300 hrs test observations, finally determined the monitoring sample by late 2016
- The SMMAN sample: 143 gamma-ray AGNs, blazars dominate

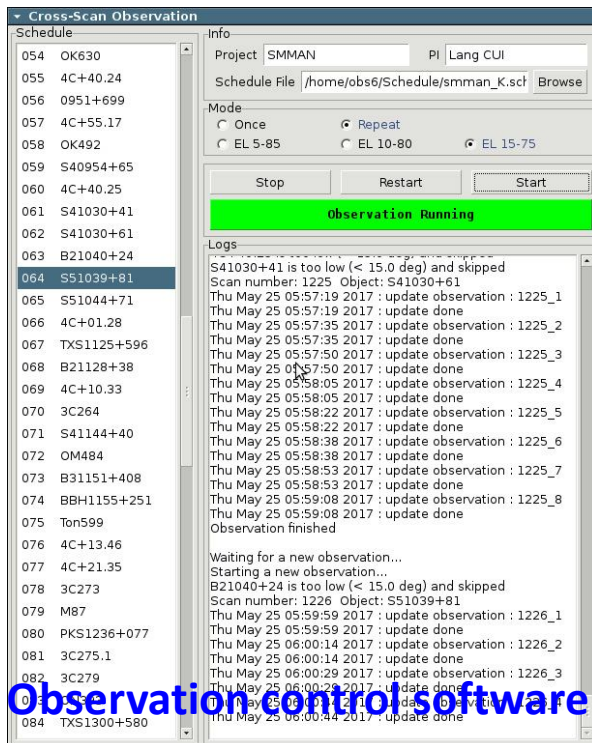




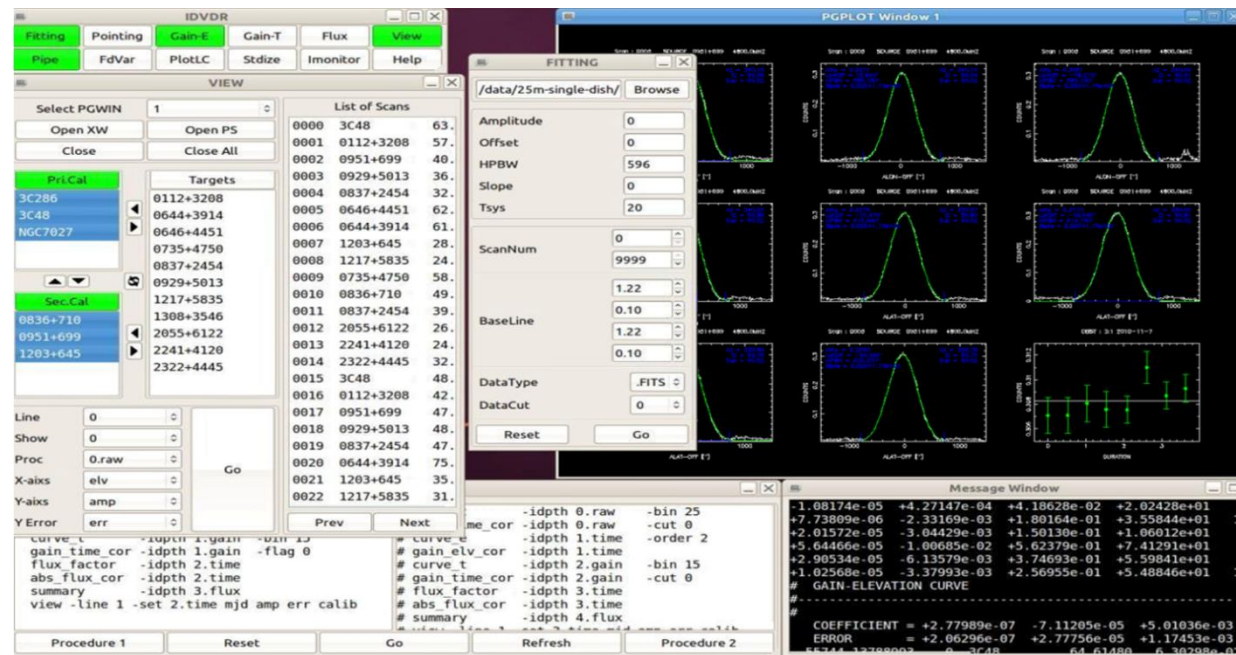
SMMAN: quasi-Simultaneous Multi-wavelength Monitoring of AGNs with NSRT

● Observation Strategy

- Jan. 2017, SMMAN launched
- Monthly @ S, C, X, K bands and upcoming Q band, ~70 hrs/month
- Observation mode: cross-scan, absolute flux calibration
- Data reduction and calibration software: development finished
- The website for data release: under construction



Observation Control Software



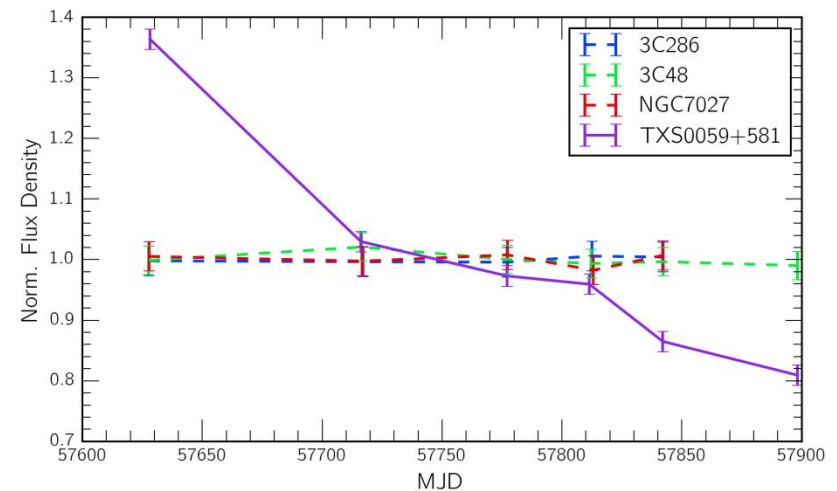
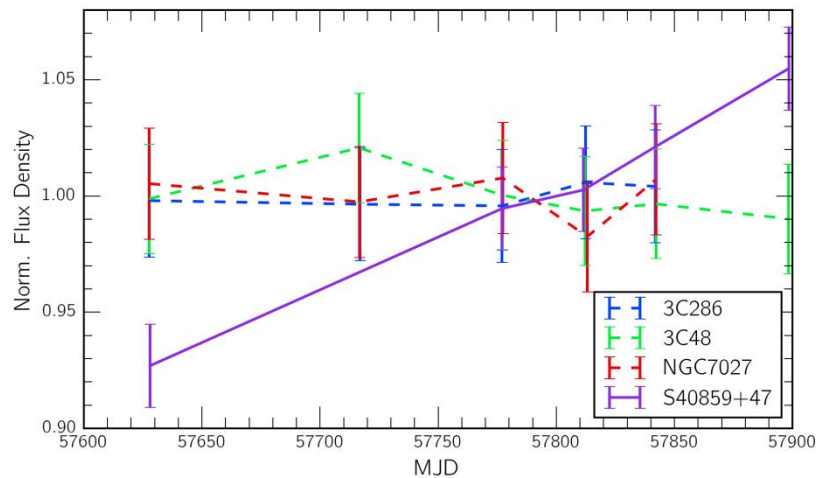
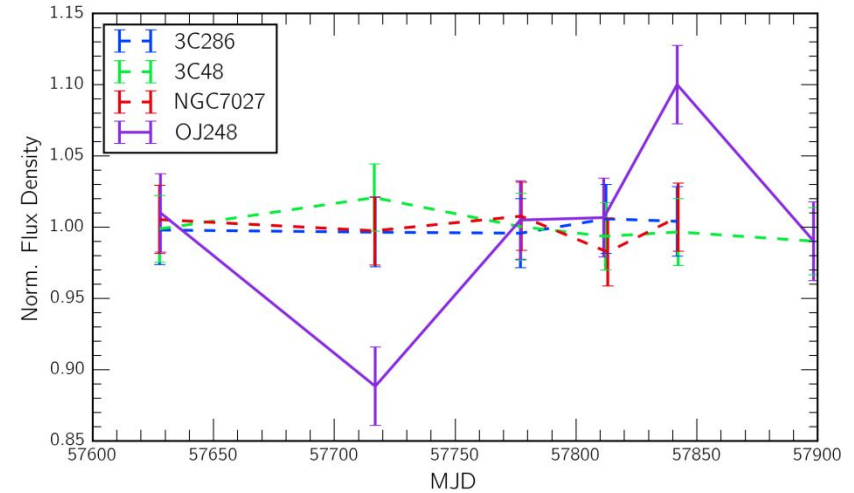
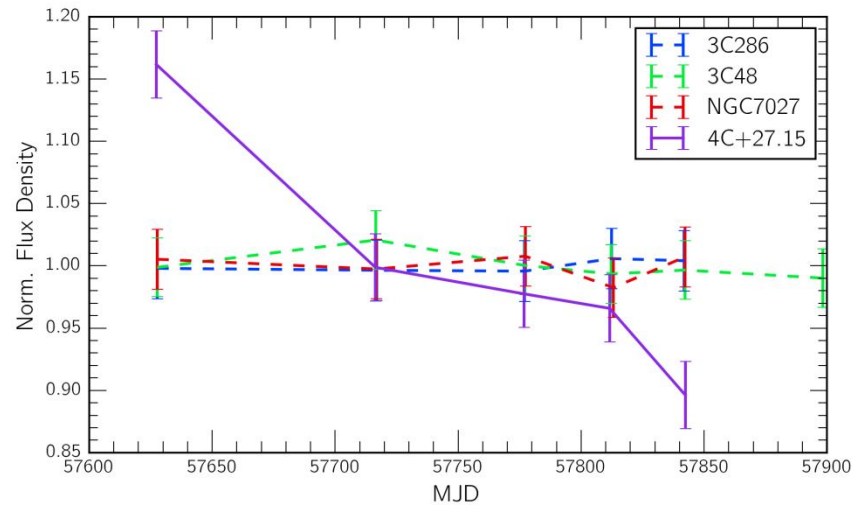
Cross-scan and data reduction



SMMAN: quasi-Simultaneous Multi-wavelength Monitoring of AGNs with NSRT

● Preliminary Results (@ 5GHz)

➤ Inter-month variations?

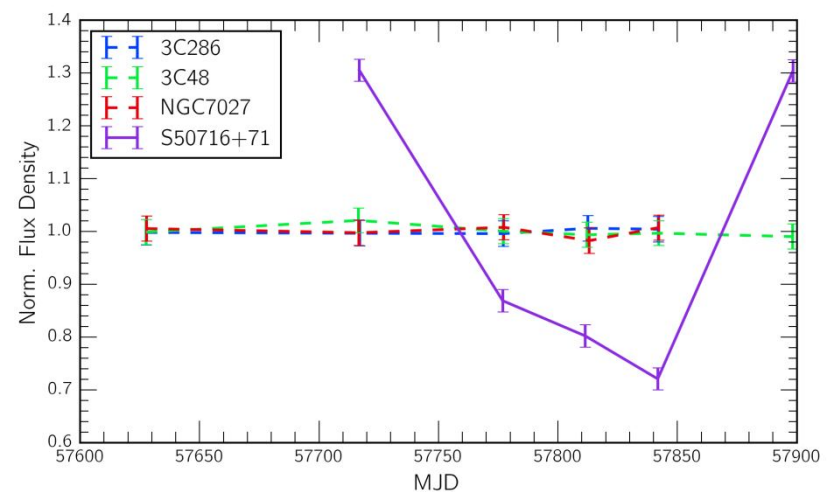
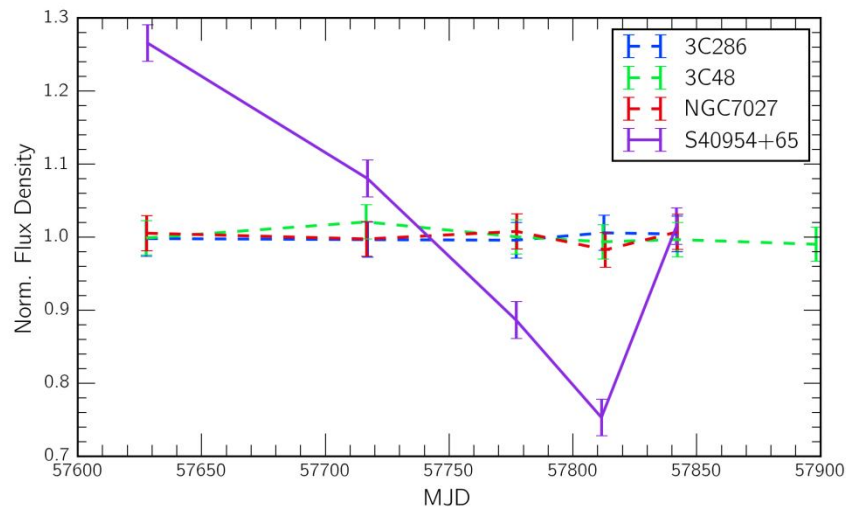
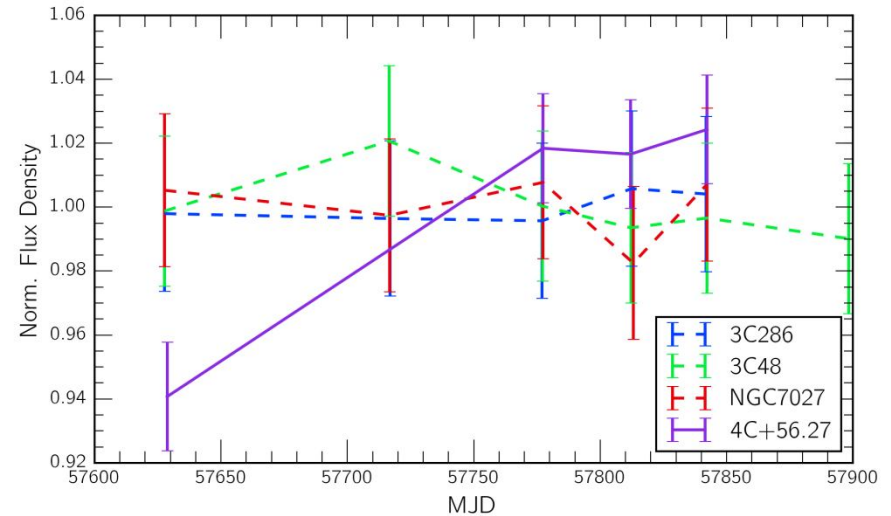
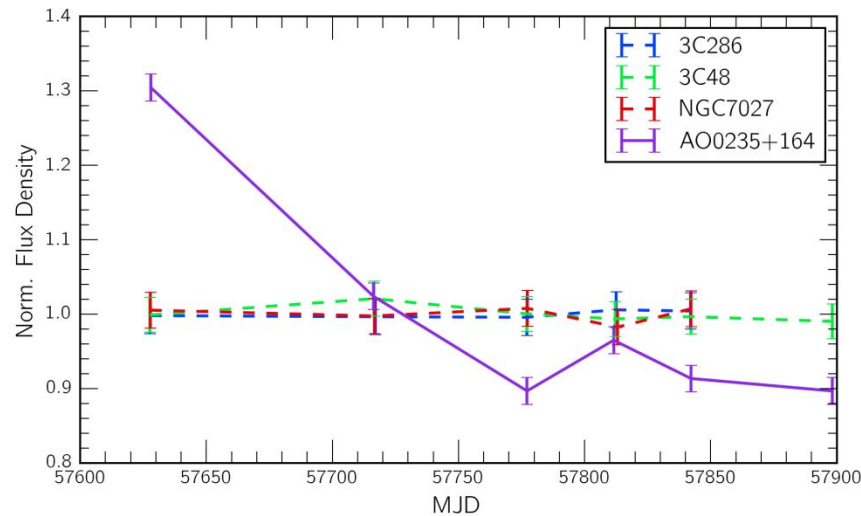




SMMAN: quasi-Simultaneous Multi-wavelength Monitoring of AGNs with NSRT

● Preliminary Results (@ 5 GHz) – cont.

➤ Inter-month variations?





SMMAN: quasi-Simultaneous Multi-wavelength Monitoring of AGNs with NSRT

● *Summary*

- The newly upgrading NSRT comes back to VLBI family and restarts its single-dish sciences.
- By using NSRT, we are carrying out a long-term multi-wavelength AGN flux monitoring program, namely SMMAN.
- The data of SMMAN will be opened soon and welcome to use and enjoy it.

