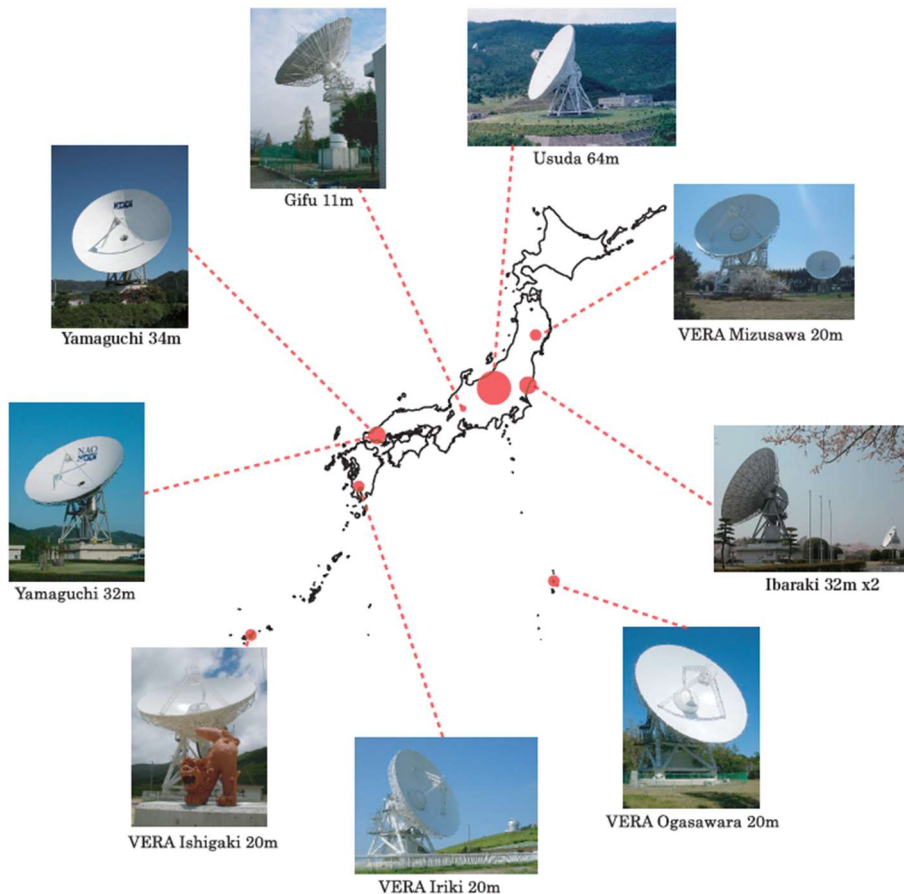
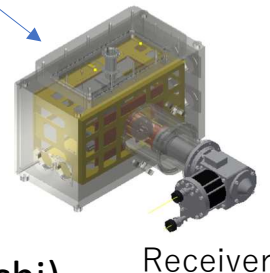


Exploring the Time-Varying Universe: From Nanoseconds to Gigaseconds with JVN

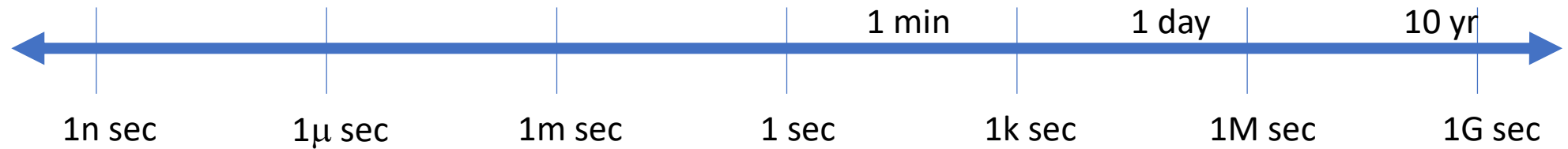
K. Fujisawa (Yamaguchi University)



- Collaboration of 6 Universities and NAOJ
 - NAOJ (VERA), Ibaraki, Tsukuba, Gifu, OMU, Yamaguchi, Kagoshima University
- Array
 - 9 telescopes (11m ~ 64m)
 - Baseline 50 - 2500 km
 - Frequency 6/8/22 GHz
 - **Sensitivity 3 mJy** (6/8 GHz, Ibaraki-Yamaguchi)
 - Ibaraki-Yamaguchi single baseline VLBI
 - Yamaguchi Interferometer (YI)
- EAVN observation: Ibaraki & Yamaguchi
- **Single-dish: >4000 hours / year**
- **Receiver development**
- Education: > 200 students have graduated



Timescale



Nano-shot

Giant-pulse /
FRB

X-ray binary /
flare star

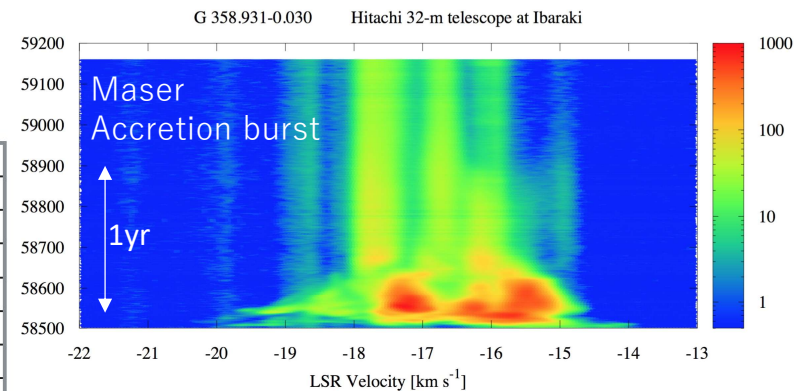
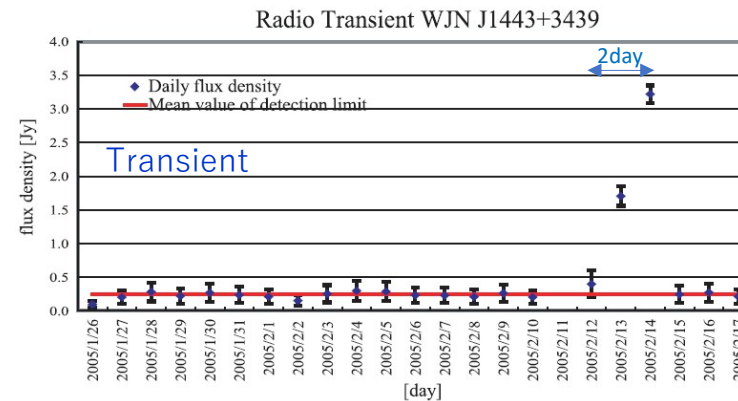
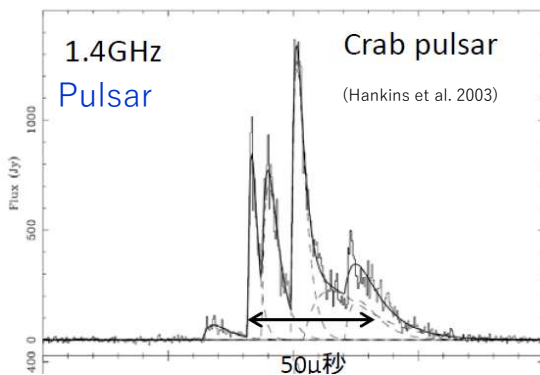
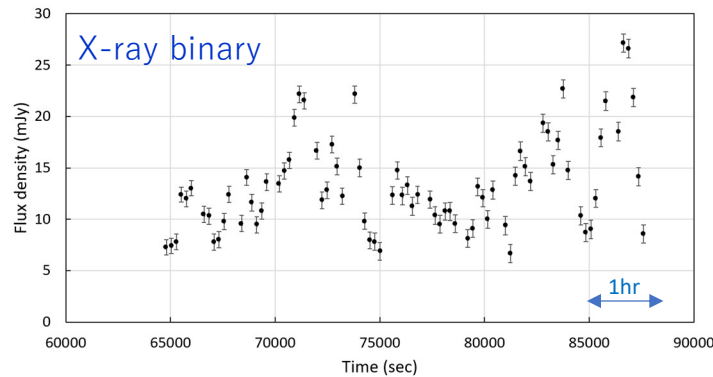
Very-high-energy
gamma-ray AGN
Supernova / transient
High-mass protostar

Methanol maser
variability:
accretion burst /
long periodicity

OH/IR stars P-L relation

SNR distance

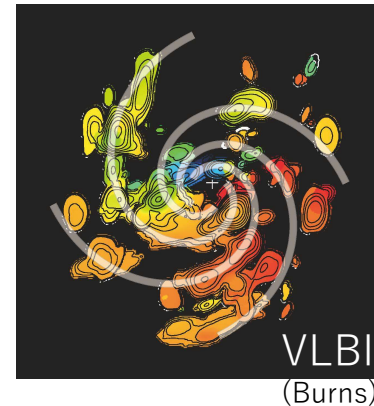
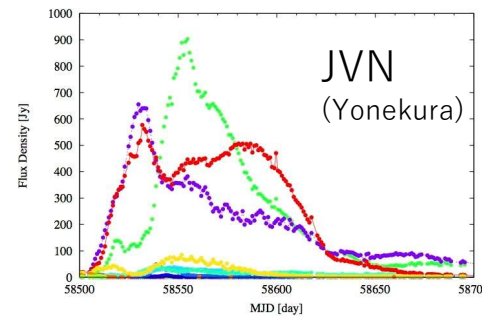
annual parallax / proper motion



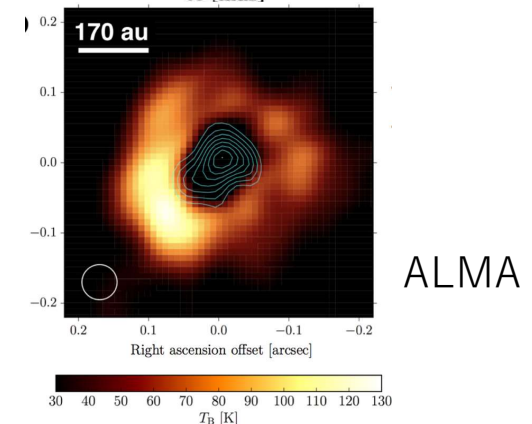
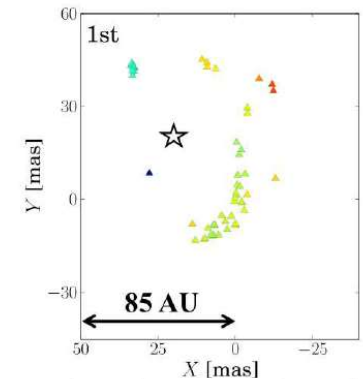
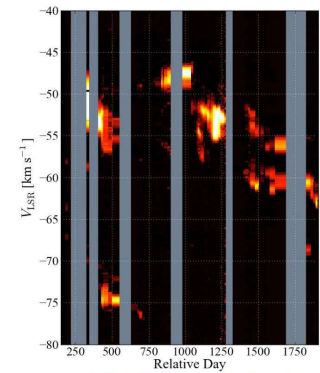
JVN and Large Telescopes

- Complementally with (open-use) large telescopes
 - Large survey / long-term monitoring with JVN
 - Detail Study with Large Telescopes
- High-mass protostar G353 (Motogi)
 - Water maser monitoring with JVN telescope
 - Pole-on outflow by VERA
 - Disk around the central star by ALMA
- Methanol maser variability (Yonekura)
 - Long-term monitoring with JVN telescope
 - Discovery of Accretion burst
 - Imaging by VLBI
- Agile follow-up (e.g., Tominaga-san's talk)
 - AGN's Gamma-ray activity
 - Neutrino event
 - GRB, Supernova
- Ambitious research
 - While conducting unique research, also participate in trending research

Accretion Burst



G353



(Local) University support by NAOJ

- University support by NAOJ
 - Open-use of large telescopes / facilities
- Various support measures
 - JVN, OISTER
 - Financial support for University
 - Specially appointed assistant professor
 - ...
- A wide range of research activities is necessary for top science
 - "High mountains have wide bases"
- JVN's effects
- Create researcher position
 - Research development
 - Large telescope user
- Providing astronomy education to many students
 - More than 120 graduates in Yamaguchi
 - Become a sympathizer and supporter of astronomy
- Some students become astronomers
- Increased awareness and understanding of astronomy
 - University leaders pay attention to the activities of astronomers
 - Astronomy can be widely disseminated to society