the ambient medium, and are related to the gamma-ray flare which has been detected with VHE gamma-ray telescopes such as MAGIC and VERITAS.

[구 KVN-02] LINEAR POLARIZATION OF CLASS I METHANOL MASERS IN MASSIVE STAR-FORMING REGIONS

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Class I methanol masers are found to be good tracers of the interaction between outflows from massive young stellar objects with their surrounding media. Although polarization observations of Class II methanol masers have been able to provide information about magnetic fi elds close to the central (proto)stars, polarization observations of Class I methanol masers are rare, especially at 44 and 95GHz. We present the results of linear polarization observations of 39 Class I methanol maser sources at 44 and 95GHz. These two lines are observed simultaneously with one of the 21m Korean VLBI Network telescopes in single-dish mode. Approximately 60% of the observed sources have fractional polarizations of a few percent in at least one transition. This is the fi rst reported detection of linear polarization of the 44GHz methanol maser. We also observed 7 targets with the KVN in VLBI mode. We will present its preliminary results, too.

[구 KVN-03] The Power of Simultaneous Multi-frequency Observations for mm-VLBI: Beyond Frequency Phase Transfer

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Atmospheric propagation effects at millimeter wavelengths can significantly alter the phases of radio signals and reduce the coherence time, putting tight constraints on high frequency Very Long Baseline Interferometry (VLBI) observations. In previous works it has been shown that non-dispersive (e.g. tropospheric) effects can be calibrated with the frequency phase transfer (FPT) technique. The coherence time can thus be significantly extended. Ionospheric effects, which can still be significant, remain however uncalibrated after FPT, as well as the instrumental effects. In this work, we implement a further phase transfer between two FPT residuals (i.e. so-called FPT2) to calibrate the ionospheric effects based on their frequency dependence. We show that after FPT2, the coherence time at 3 mm can be further extended beyond 8 hours, and the residual phase errors can be sufficiently canceled by applying the calibration of another source, which can have a large angular separation from the target (> 20 ○). Calibrations for all-sky distributed sources with a few calibrators are also possible after FPT2. One of the strengths and uniqueness of this calibration strategy is the suitability for high frequency all-sky survey observations including very weak sources. We discuss the introduction of a pulse calibration system in the future to calibrate the remaining instrumental effects and allowing the possibility of imaging the source structure at high frequencies with FPT2, where all phases are fully calibrated without involving any sources other than the target itself.

[구 KVN-04] Simultaneous VLBI observations of H2O and SiO masers toward VX Sgr using KVN

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We performed simultaneous VLBI observations of H2O 616-523 (22.2 GHz) and SiO v=1, 2, J=1-0 (43.1, 42.8 GHz) and v=1, J=2-1, J=3-2 (86.2, 129.3 GHz) masers toward VX Sagittarius using the Korean VLBI Network (KVN). The astrometrically registered maps of the 22.2 GHz H2O and 43.1, 42.8, 86.2 SiO masers were successfully obtained at two epochs of 2016 February 27 and 2016 March