[구KVN-03] A Candidate of KVN KSP: Origins of Gamma-ray flares in AGNs

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We propose a three-year Key Science Program (KSP) consisting of VLBI monitoring observations and single dish (SD) rapid response observations (RRO). The VLBI monitoring observations are comprised of ten 24-hr observations per year (every month) of about 30 gamma-ray brigt active galactic nuclei (AGNs) with Korea VLBI Network (KVN) at 22, 43, 86, and 129 GHz. The SD RROs may consist of twelve 7-hr observations per source (every week for 3 months after triggering) of gamma-ray flaring sources with two KVN SD telescopes at 22, 43, and 86 GHz in dual polarization. We expect one or two sources per year for the SD RROs. Gamma-ray flares of AGNs are known to be occured in innermost regions of relativistic jets which radiate in whole ranges of electromagnetic spectra due to synchrotron radiation, syschrotron self absorption, inverse-compton scttering, doppler boosting etc. Possible explanations of the gamma-ray flares in AGNs are a) shocks-in-jets propagating within jet flow and b) bending of the whole jets. For both cases, we should expect changes in polarization, luminosity, particle distribution, and structures of jets at mas-scale. The multifrequency simultaneous VLBI/SD observations with KVN are the best tool for detecting such changes correlated with gamma-ray flares. This KSP proposal aims to answer the fundamental questions about the basic nature of the flares of AGNs.

[구KVN-04] Observational Studies of Masers in Star-forming Regions with KVN and KaVA

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Methanol masers are divided into two classes, I and II. Class II methanol masers trace the disk-outflow systems of massive young stellar objects (YSOs), while class I methanol masers appear to trace the interaction regions of outflows with the ambient molecular gas. Class II masers have been extensively studied by single dishes, connected arrays, and VLBIs. Meanwhile, class I masers have been much less studied. They have not been detected by any VLBI facility. Thus they have been believed to have more extended structures than class II masers. We made fringe surveys of 44GHz class I methanol maser emission towards more than 150 massive YSOs with flux densities >10 Jy using the Korean VLBI Network (KVN), and detected fringes in ~10% of the sources. We performed follow-up imaging observations of the detected maser sources with KVN and KVN+VERA (KaVA). The observations aim to investigate the distribution and kinematics of 44GHz methanol maser features in each source at milli-arcsecond resolutions, and to understand what they trace. In this talk we will present the fringe survey and imaging results and our plans for further studies. Additionally, we will also introduce the preliminary results of single-dish polarization observations of water and class I methanol masers.