

**[구ID-09] First Simultaneous Dual-Frequency Phase Referencing VLBI Observation with KVN**

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We present the results of the first simultaneous dual-frequency VLBI observation with KVN (Korean VLBI Network). The KVN has a unique multi-frequency receiving system performing simultaneous observations at four frequencies, such as 22, 43, 86, and 129 GHz, in order to calibrate the atmospheric phase fluctuations, which cause a severe degradation of an interferometric coherence in mm-VLBI regime. In order to test the multi-frequency phase referencing capability of KVN, we observe the bright continuum VLBI source, NRAO 150 at two different frequencies of 21.7 (K band) and 43.4 (Q band) GHz simultaneously. The VLBI fringe phases at K and Q bands show a tight correlation of phase behaviors and the results of phase referencing (residual phase, coherence etc) are promising for achieving excellent phase referencing observations with KVN. The KVN will be able to open new perspectives in the multi-frequency study of VLBI.

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**[구ID-10] Updated Comparison Study of Extensive Air Shower Simulations with COSMOS and CORSIKA**

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Experiments to study high-energy cosmic rays (CRs) employ Monte Carlo codes for extensive air shower (EAS) simulations to figure out the properties of CRs. COSMOS and CORSIKA among EAS simulation codes are currently being used to analyze the data of the Telescope Array experiment. We have generated a library of about 10,000 simulated EASs with the primary energy ranging from  $10^{18.5}$  eV to  $10^{20}$  eV and the zenith angle of primary particles ranging from 0 to 45 degree for proton and iron primaries. We have compared the results predicted by CORSIKA and COSMOS under the same condition. In this talk, we show the differences in the energy spectra at the ground, the longitudinal shower profile as a function of atmospheric depth, the Calorimetric energy, and the Xmax distribution. We also discuss the lateral distribution function obtained from GEANT4 simulations which is being used to measure the detector response.