

P112a      **KaVA Large Program: Understanding high-mass star formation through  
KaVA observations of water and methanol masers**

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We have started a systematic observational study of the 22 GHz water and 44 GHz class I methanol masers in high-mass star-forming regions as a four-year KaVA (KVN and VERA Array) large program since 2016. The primary science goal is to understand dynamical evolution of high-mass young stellar objects (HM-YSOs) and their circumstellar structures by measuring spatial distributions and 3D velocity fields of water and methanol maser features. Our sample consists of 87 HM-YSOs in various evolutionary phases, many of which are associated with multiple maser species. In the first year, we will carry out snap-shot imaging survey to search for suitable target sources. Based on these results, multi-epoch monitoring observations will be started to measure proper motions of selected target sources from the second year. By combining follow-up observations with VERA (astrometry), JVN/EAVN (6.7 GHz class II methanol masers), ALMA (thermal molecular lines and continuum), and other available data, we will reveal physical properties and 3D dynamical structures of disk/jet/outflow/UCHII/infalling envelope, and their relationship between evolutionary phases of HM-YSOs.

In this talk, we will present brief summary of our large program and show the initial results.