

Q25a Tracing the methanol deuteration towards Perseus low-mass protostars

Shaoshan Zeng (RIKEN), Akemi Tamanai (RIKEN), Takahiro Oyama (RIKEN), Yuki Ohno (RIKEN), Yoshimasa Watanabe (Shibaura kodai), Takeshi Sakai (UEC), Nami Sakai (RIKEN), Yao-lun Yang (UVA) and PEACHES members

The hydrogen-to-deuterium (D/H) ratio has been extensively employed as a diagnostic tool for studying the physical and chemical evolution of interstellar sources. Methanol (CH_3OH) is one of the molecules that exhibits the highest deuterium fractionation, especially towards the low-mass star-forming regions. Its deuteration can occur in the methyl ($-\text{CH}_3$) group such as CH_2DOH and the hydroxyl ($-\text{OH}$) group such as CH_3OD . Literature studies have shown that deuteration process seems to occur more efficiently on the methyl group than the hydroxyl group, which may reflect the different formation route(s) of these two deuterated methanols. In this talk, we will present our preliminary study of methanol fractionation towards a number of Perseus low-mass protostars. This study carried out the ALMA chemical surveys (PEACHES project: Yang . et al. 2021, ApJ, 910, 20) in combination with laboratory-based spectroscopic measurements of CH_2DOH and CH_3OD by means of our emission type Spectrometer Using superconductor MIxer Receiver (SUMIRE). We will discuss how our result may help to improve our understanding of the difference in deuteration between the methyl and hydroxyl group as well as the possible applications of highly accurate and reliable spectroscopic results by SUMIRE.