60cm電波望遠鏡の音響光学型電波分光計の開発

海田　正大*・土橋　一仁*・西浦　慎悟*・小川　英夫**・米倉　覚則**
中島　拓**・半田　利弘***・河野　孝太郎***・森野　潤一****
地学科*

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Abstract

We report on the performance of two new Acousto-Optical spectrometers (AOSs) that we developed for the 60cm radio telescope equipped with a new sideband-separating (2SB) receiver system which enables us to detect two different radio frequencies simultaneously. Each AOS has a bandwidth of 250 MHz and a frequency resolution of 240-280 kHz depending on the frequency within the band. An old AOS used for the telescope was rather unstable, because it used to be installed in a small receiver-cabin where an accurate control of the ambient temperature affecting the stability of the spectrometer was difficult due to the limited room space. We set up the new AOSs in a larger operation room where better control of the ambient temperature can be available. As a result, the AOSs have become stable over >70 seconds, longer than the time scale of a typical drift of the atmospheric emission (0.5-1 minute).

In 2005 March, we successfully made simultaneous observations in ^{12}CO(J=2-1) and ^{13}CO(J=2-1) emission lines toward Orion KL for the first time using the new system, i.e., the 2SB receiver and the two AOSs. After some improvements, we further made mapping observations of several objects in 2005 October, and found that the whole system including the AOSs is stable enough to carry out regular observations.

Key words : millimeter-wave radio telescope, acousto-optical spectrometer, radio astronomy

Department of Astronomy and Earth Sciences, Tokyo Gakugei University, 4-1-1 Nukui-kita-machi, Koganei-shi, Tokyo 184-8501, Japan

＊　東京学芸大学（184-8501　小金井市貫井北町4−1−1）
＊＊　大阪府立大学（599-8531　大阪府堺市中区学園町1−1）
＊＊＊　東京大学天文学教育研究センター（181-0015　東京都三鷹市大沢2−21−1）
＊＊＊＊　国立天文台光赤外研究部（181-8588　東京都三鷹市大沢2−21−1）