Tombaugh 2 : the mean metallicity [Fe/H] = -0.48±0.14 dex ; the reddening E(B-V) = 0.30 ; the distance d = 7.9±0.8kpc ; the galactocentric distance RGC = 14.7kpc ; the distance from the galactic plane z = -0.9kpc, and the age t = 2.0±0.4Gyrs.

The metallicity estimates of these two clusters we obtained in this study are consistant with the relation of the metallicity and the galactocentric distance of old open clusters.

Spectra of Isotopic Molecules in Comets

Kim Sang Joon
Kyunghee Observatory, Department of Astronomy and Space Science
Kyunghee University
Email : sjkim@khobs.kyunghee.ac.kr

Bright comets, such as Hyakutake(C/1996 B2) and Hale-Bopp(C/1995 O1), may provide opportunities to detect weak isotopic lines of ^{18}OH, $C^{34}S$, and CD near strong cometary emission lines of ^{16}OH, $C^{32}S$, and CH. Expected line positions and intencities of the delectronic bands of these isotopic molecules have been calculated using molecular constants available in literature. Detectability of these molecules with various spectral resolutions will be discussed.

On the Temperature Structure of Jupiter's Auroral Thermosphere

Yong Ha Kim
Dept. of Astronomy and Space Science, Chungnam Univ. Daejon, KOREA
e-mail : ykim@nsastro8.chungnam.ac.kr

Recent observations of Jupiter's aurora at UV and IR wavelengths have revealed remarkable structures of auroral ovals around both poles. The observed UV emissions consist of H_2 Lyman and Werner band systems excited by auroral particle precipitation, while the most-pronounced IR emissions are from H_3^+ ν_2 fundamental vibration band around 3.5 micron. These emissions are considered to originate from different altitudes, thereby providing complementary information on auroral thermosphere/ionosphere of Jupiter. Especially, temperature information has been successfully sounded from high resolution spectra of both H_2 and H_3^+ emissions. Spectral observations of the auroral H_2 and H_3^+ emissions are briefly reviewed, and an empirical temperature profile of the auroral thermosphere is constructed with inferred temperatures and altitudes from the observations. The temperatures seem to increase rapidly around the methane homopause, resulting in more vertically-extended thermosphere than for non-auroral regions. Cooling rates by hydrocarbon, H_3^+, and H_2 IR emissions are calculated from the empirical temperature profile and are compared with heating rates from auroral electron precipitation and solar UV absorption. It is found that the required heating rates to balance the IR cooling rates are 180 - 200 erg/cm^2/sec, orders of magnitude greater