THE GALAXY IN HYDROXYL

I.G.KOLESNIK and L.V.YUREVICH
Main Astronomical Observatory
Ukrainian Academy of Sciences
252127 Kiev, Goloseevo
USSR

On the base of the Galaxy survey in OH lines at 1665 and 1667 MHz (Turner (1979,Astron.Astrophys.Suppl.Ser. **37**,1)) the method of distance determination to molecular clouds was proposed. It was shown (Kolesnik and Yurevich (1985,Astrofizika **22**,461)) that the Δv – a linewidth (in $km \cdot s^{-1}$) and T_A – a linedepth (in K) of the OH absorption features could be combined into a parameter $D(r) = (\Delta v^2/T_A)^{1/3}$ that is sensitive to the distance r (in kpc) of molecular cloud where this OH absorption is formed. The calibration of (D–r)–relation gives

$$D_{1665} = 0.54\ r + 2.24 \quad \text{and} \quad D_{1667} = 0.51\ r + 1.97.$$

Using the (D–r)–relation heliocentric distances to 1138 galactic molecular clouds have been determined. Considering the radial velocities of these clouds, the galactic rotation curve as well as pecular motions in OH–gas up to the galactocentric distance about 15 kpc were envestigated. In radial motions the 3kpc expanding arm with velocity of 50 $km \cdot s^{-1}$ was detected. The rotation curve beyond the solar circle of radius R_O=8.5kpc, that was also independently determined from the OH data, continues to rise slowly up to velocity about 350 $km \cdot s^{-1}$. From OH data the 5kpc molecular ring is well detected. This argues the applicability of (D–r)–relation for distance determination of molecular clouds from the OH survey. The spiral pattern of the Galaxy was visualized from systematic kinematic motions of OH molecular clouds. It was shown that OH cloud kinematic pattern in the galactic plane could be discribed by two–fold logarithmic model structure having pitch angles of 8° and 10°. A Local spiral arm was also clearly distinguished.