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New Views on the Chemistry of the Diffuse Interstellar Medium

Prof. Karl M. Menten

(Max-Planck-Institute fuer Radioastronomie)

Dr. Karl Menten became the Director for Millimeter and Submillimeter Astronomy at the Max-Planck-Institute for Radio Astronomy (MPIfR) in Bonn, Germany in December 1996 and, since Febuary 2008, has been the institute’s Executive Director. From 2001 on, he has been a member of the Faculty of Mathematics and Natural Sciences of Bonn University. Dr. Menten earned his Dr. rer. nat. degree from Bonn University in 1987 after performing his dissertation work at the MPIfR. Most of Dr. Menten’s research involves radio and (sub)millimeter wavelength emission from dust and molecules in the Universe and their chemistry. Areas of concentration have included the formation of stars in Giant Molecular Clouds, astrophysical masers and lasers, imaging radio emission from protostars, young stellar objects, and evolved stars, circumstellar envelopes, the central regions of our and other galaxies, atomic and molecular gas, dust and star formation at cosmological distances and gravitational lenses. Dr. Menten has coauthored more than 220 refereed publications and has received various honors including two Smithsonian Institution career awards, a 2004 Philip Morris Research Prize, and, in 2007, the 42nd annual Karl G. Jansky Lectureship awarded by NRAO/the Trustees of Associated Universities, Inc. He is a member of the North-Rhine Westphalian Academy of Sciences and the German National Academy of Sciences Leopoldina.

***ALMA**, image: http://www.almaobservatory.org/*

Abstract

Starting in the late 1930s, studies of molecular absorption toward diffuse and translucent clouds (in the solar neighborhood) have traditionally been in the realm of optical and, later, ultraviolet (UV) and infrared (IR) spectroscopy. Over the last decades, observations at radio and (sub)mm wavelengths have greatly added to our knowledge of the chemistry of the diffuse interstellar medium (ISM) Galaxy-wide. Measurements toward strong continuum sources are a powerful means to detect spectral lines that have their lower level in (or near) the rotational ground state of a molecule and may be the only way to detect a number of species in low density environments or even at all. Recent high sensitivity/high spectral resolution absorption measurements with the Herschel Space Observatory of the ground state lines from several key light hydrides not observable from the ground have had a transformative impact on our knowledge of diffuse ISM chemistry. For example, we can now understand fundamental oxygen chemistry with the detection of, all, H2O, H2O+, OH+ and H3O+. The same is true for the pathways to carbon- and nitrogen-bearing species. I shall give an overview of the Herschel results, augmented by data obtained with APEX and SOFIA in the context of our studies of the Milky Way’s structure.

All are welcome! Tea, coffee, biscuits will be served at 10:15 A.M.