



Prof. Ewine Fleur van Dishoeck
Professor of Molecular Astrophysics, Leiden University,
The Netherlands



Most important awards, prizes and academies

Van Dishoeck is a (foreign) member or associate of several academies, including Member of the Dutch Royal Academy of Sciences (2001), Foreign Associate of the US National Academy of Sciences (2001), Foreign Member of the American Academy of Arts and Sciences (2008), Associate Member of the Royal Astronomical Society UK (2010), Member of the Leopoldina Academy of Sciences Germany (2014), Member of the Norwegian Academy of Sciences (2019), Foreign Member of the Russian Academy of Sciences (2020) and Member of the American Philosophical Society (2020).

Van Dishoeck received various awards for her research including the Maria Goeppert-Mayer award of the American Physical Society (1993), Gold Medal of the Royal Dutch Chemical Society (1994), Spinoza Award of the Dutch National Science Foundation (2000), Bourke Medal of the UK Royal Society of Chemistry (2001), Aaronson award of the University of Arizona (2001), Physica Prize of the Netherlands Physical Society (2005), Petrie award of the Canadian Astronomical Society (2007), Grubb-Parson award of the University of Durham (2007), American Astronomical Society Laboratory Astrophysics Prize (2012), Lise Meitner Goteborg award in physics (2014), Lodewijk Woltjer prize of the European Astronomical Society (2014), Albert Einstein World Award

for Science (2015), James Craig Watson Medal of the US National Academy of Sciences (2018), Kavli Prize for Astrophysics (2018), Karl Schwarzschild medal of the Astronomische Gesellschaft Germany (2019), Honorary Doctorate of the University of Geneva (2019), Prix Jules Janssen of the French Astronomical Society (2020), Niels Bohr International Gold Medal (2022).

Summary of scientific research

The research of van Dishoeck's group innovatively combines the world of chemistry with that of physics and astronomy to study the formation and evolution of molecules (water, organic species) from star-forming clouds to planet-forming disks around young stars. These molecules are also used as diagnostic probes of the physical structure of interstellar regions. Trained as a theoretical chemist, part of her work focuses on understanding and quantifying the basic processes that take place under the exotic conditions in interstellar space, most notably how molecules fall apart under UV radiation. She is also involved in experiments to simulate the chemical processes on icy grain mantles. On the observational side, her group exploits state-of-the-art observations at millimeter and infrared wavelengths obtained with telescopes such as the ESO Very Large Telescope, the ESA Herschel Space Observatory, the Atacama Large Millimeter Array and the James Webb Space Telescope, facilities in which she has been heavily involved in the planning. The third leg of her research involves the development of sophisticated physical-chemical models of gas-phase and gas-grain chemistry from the small to large scales. van Dishoeck has a passion for outreach to the general public and a special interest in art and astronomy.

Main publications

Van Dishoeck authored or co-authored 660 refereed papers, 65 invited review papers, more than 500 conference contributions, 26 miscellaneous and popular papers, and editor of 2 books. Her most important publications include:

- The photodissociation and chemistry of interstellar CO, E.F. van Dishoeck, J.H. Black 1988, *Astrophysical Journal* 334, 771
- Comprehensive models of diffuse interstellar clouds: physical conditions and molecular abundances, E.F. van Dishoeck, J.H. Black 1986, *Astrophysical Journal Suppl.* 62, 109
- Chemical evolution of star-forming regions, E.F. van Dishoeck, G.A. Blake 1998, *ARA&A* 36, 317
- Molecular abundances and low-mass star formation. II. Organic and deuterated species toward IRAS 16293-2422, E.F. van Dishoeck, G.A. Blake, D.J. Jansen, T.D. Groesbeck 1995, *Astrophysical Journal* 447, 760
- An atomic and molecular database for analysis of submillimeter line observations, F.L. Schoier, F.F.S. van der Tak, E.F. van Dishoeck, J.H. Black 2005, *Astronomy & Astrophysics* 432, 569
- Complex organic interstellar molecules, E. Herbst, E.F. van Dishoeck 2009, *ARA&A* 47, 427
- Water: from clouds to planets, E.F. van Dishoeck, E.A. Bergin, D.C. Lis, J.I. Lunine 2014, in *Protostars & Planets VI*, ed. H. Beuther et al. (Tucson: Univ. Arizona), p. 835
- A major asymmetric dust trap in a transition disk, N. van der Marel, E.F. van Dishoeck et al. 2013, *Science*, 340, 1199

- Photodissociation and photoionization of atoms and molecules of astrophysical interest, A.N. Heays, A.D. Bosman, E.F. van Dishoeck 2017, *Astronomy & Astrophysics* 602, A105
- Water in star-forming regions: physics and chemistry from clouds to disks as probed by Herschel spectroscopy, E.F. van Dishoeck, L.E. Kristensen et al. 2021, *Astronomy & Astrophysics* 648, A24