Astronomical observations of cold regions in the universe show a rich inventory of ices. Part of these ices may end up on planets like our own, but in that journey they will be exposed to considerable amounts of radiation. As water is the main component of these ices, the optical and photochemical properties of water ice largely determine how the radiation affects the molecules embedded in the ice.

In this thesis, water ice is investigated as a host for photochemical reactions. A new laboratory setup is constructed, and two types of molecules are studied: glycine, an amino acid, and triphenylene, a polycyclic aromatic hydrocarbon. The photochemistry upon exposure to ultraviolet radiation is studied using UV-vis and infrared spectroscopy. In addition, the optical properties of water ice are constrained in the UV-vis range, resulting in high-resolution optical constants, relevant for all ice-rich environments - from far away in space to our atmosphere. Water itself does not absorb light in this range, but as most organic molecules do, and are destroyed by radiation in this range, this is of high importance for molecules within the ice.

Vincent Kofman

Laboratory studies of water ice in space - optical and photochemical properties -

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