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LIDA - the Leiden Ice Database for Astrochemistry

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Atomic and molecular data obtained from experiments are crucial for deriving meaningful information of astrophysical environments such as densities, temperatures and chemical abundances. In this regard, electronic databases have been of utmost importance for providing fundamental information in an organized and accessible way. In the last decades, dedicated databases for the gas phase (e.g., CDMS, LAMDA, BASECOL and KIDA), and solid-phase molecules (e.g., Jena, NASA/Ames and SSHADE) have allowed important discoveries about the chemistry in star- and planet-forming regions. In this context, the Leiden Ice Database for Astrochemistry (LIDA; <https://icedb.strw.leidenuniv.nl/>), has played for years an important role by supporting the studies of many molecules in the solid-phase toward protostars (e.g, H₂O, CO, CO₂, CH₄, NH₃ and CH₃OH, OCN⁻, NH₄⁺, OCS). In 2022 a major upgrade of LIDA was performed, envisioning the exquisite data that is planned to be observed with the James Webb Space Telescope - JWST and future telescopes (e.g., Extremely Large Telescope). First, we have made publicly available the infrared spectra of several molecules, including the major ice components and complex organic molecules. LIDA also hosts data of laboratories other than those measured in Leiden. Altogether, LIDA host more than 1100 infrared spectra of ices that mimic different astrophysical conditions. Additionally, LIDA also hosts UV-vis optical constants of ices measured in Leiden and online tools. They allow the calculation of the mid-infrared complex refractive index of ices and also the creation of protostar synthetic spectra. LIDA has also been improved with many dynamical visualization tools, and a 3D molecule viewer linked to public databases of molecular properties. LIDA is a deliverable of Ice Age, an Early Release Science program of JWST and it has been extensively used by many current JWST programs. Since January/2023, LIDA has been accessed by 43 countries with an average access of 250 visits per month. The upgrades on LIDA will benefit multiple ice observations in the next years and decades.