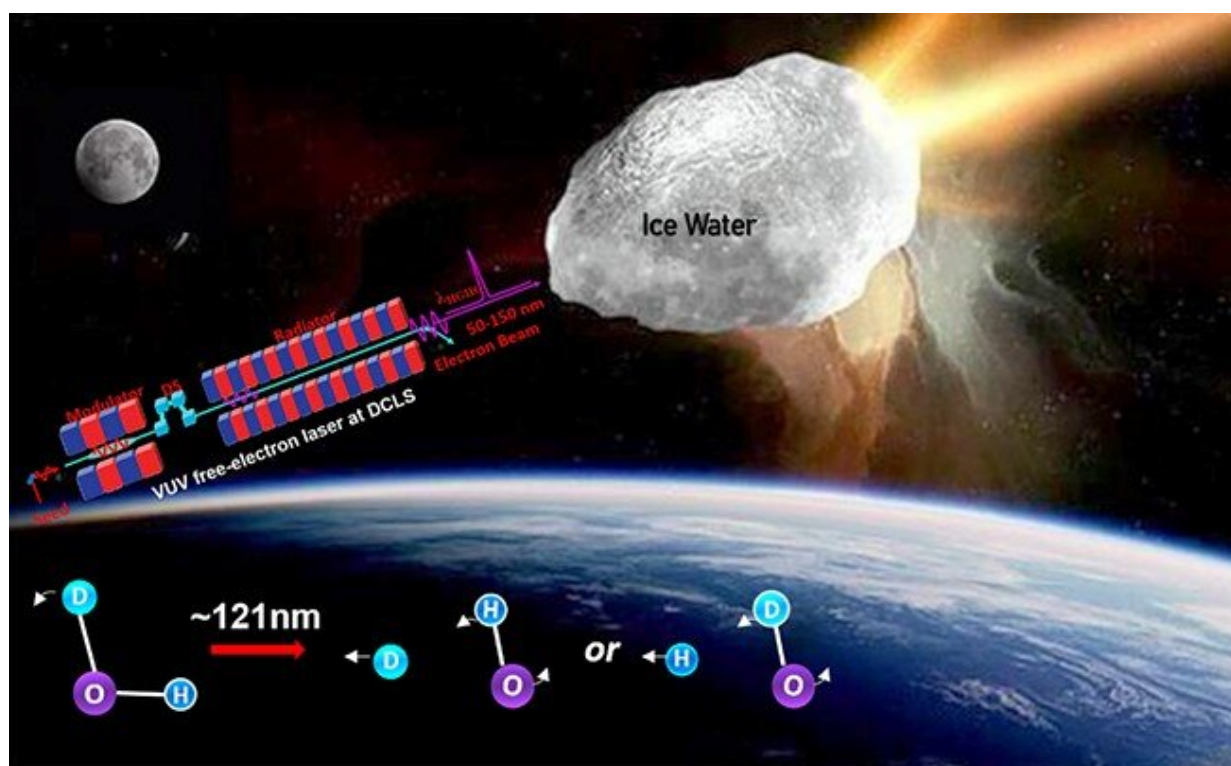


# Dalian Coherent Light Source reveals strong isotope effects in photodissociation of water isotopologue

July 23 2021



Dalian Coherent Light Source revealing strong isotope effects in water photochemistry. Credit: DICP

Recently, a research group led by Prof. Yuan Kaijun and Prof. Yang Xueming from the Dalian Institute of Chemical Physics (DICP) of the

Chinese Academy of Sciences revealed strong isotope effects in photodissociation of the water isotopologue (HOD) using the Dalian Coherent Light Source.

Their findings were published in *Science Advances* on July 23.

"Our [experimental results](#) illustrate dramatically different quantum state population distributions of OH and OD fragments from HOD photodissociation. The branching ratios of the H<sup>+</sup>OD and D<sup>+</sup>OH channels display large wavelength-dependent isotopic fractionation," said Prof. Yuan.

Because water is one of the most [abundant species](#) in the [solar nebula](#), photodissociation of water and its isotopologue by solar vacuum ultraviolet photons may be an alternative source of the D/H isotope heterogeneity, and this effect must be considered in photochemical models.

The photochemical processes identified in this work may vary the D/H isotopic ratios in the inner and outer regions, and/or in different periods of the solar nebula, which may cause the D/H isotope heterogeneity in the solar system.

**More information:** Zijie Luo et al, Strong isotope effect in the VUV photodissociation of HOD: A possible origin of D/H isotope heterogeneity in the solar nebula, *Science Advances* (2021). [DOI: 10.1126/sciadv.abg7775](#)

Provided by Chinese Academy of Sciences

Citation: Dalian Coherent Light Source reveals strong isotope effects in photodissociation of

water isotopologue (2021, July 23) retrieved 25 April 2024 from  
<https://phys.org/news/2021-07-dalian-coherent-source-reveals-strong.html>

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