Understanding and exploiting the environment of extraterrestrial bodies is a central objective of planetary science. The gas giants, such as Jupiter, Saturn, Uranus and Neptune, are rich in molecular chemistry and remain the target of prolonged scientific study.

Just like the Earth, each of these planets orbit the sun with its own eccentricity and obliquity, leading to seasonal variations in incident solar radiation and thus a cycling chemical composition with latitudinal and altitudinal variations in the abundances of the various molecular constituents.

Recently, Prof. Yuan Kaijun and Prof. Yang Xueming's group from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences, in cooperation with Prof. Michael N. R. Ashfold from the University of Bristol and Prof. Christopher S. Hansen from the University of New South Wales revealed the new dissociation channels in the ethane photochemistry by using the Dalian Coherent Light Source (DCLS).

The scientists demonstrated contributions from at least five primary photofragmentation pathways yielding CH$_2$, CH$_3$ and/or H atom products from ethane following VUV excitation.

These results point to several shortcomings in the description of ethane photochemistry used in contemporary models of the atmospheres of the gas giants and help rationalize hitherto unexplained aspects of the ethane/acetylene ratios observed in the Cassini-Huygens fly-by of Jupiter.

The study was published in *Chemical Science*.
