

Protonated acetylene in the $z=0.89$ absorber toward PKS1830-211

The line of sight to the lensed blazar PKS1830-211 intercepts the disk of a foreground spiral galaxy at $z=0.89$ where absorption has been detected for more than 60 molecular species, mostly at mm wavelengths. In a paper accepted for publication in *A&A*, Sebastien Muller and colleagues report the detection of a new interstellar molecule, protonated acetylene $C_2H_3^+$, based on ALMA observations of this absorber. The molecule has been suspected to be present in the interstellar medium for a long time, but it has eluded detection so far due to the unfavorable frequencies of its rotational spectrum. Thanks to the redshift of the absorber, the ground-state transitions of both ortho and para forms could be detected in ALMA high-sensitivity spectra. As one of the initial hydrocarbon building blocks, $C_2H_3^+$ is thought to play an important role in astrochemistry, in particular in the formation of more complex organic molecules.

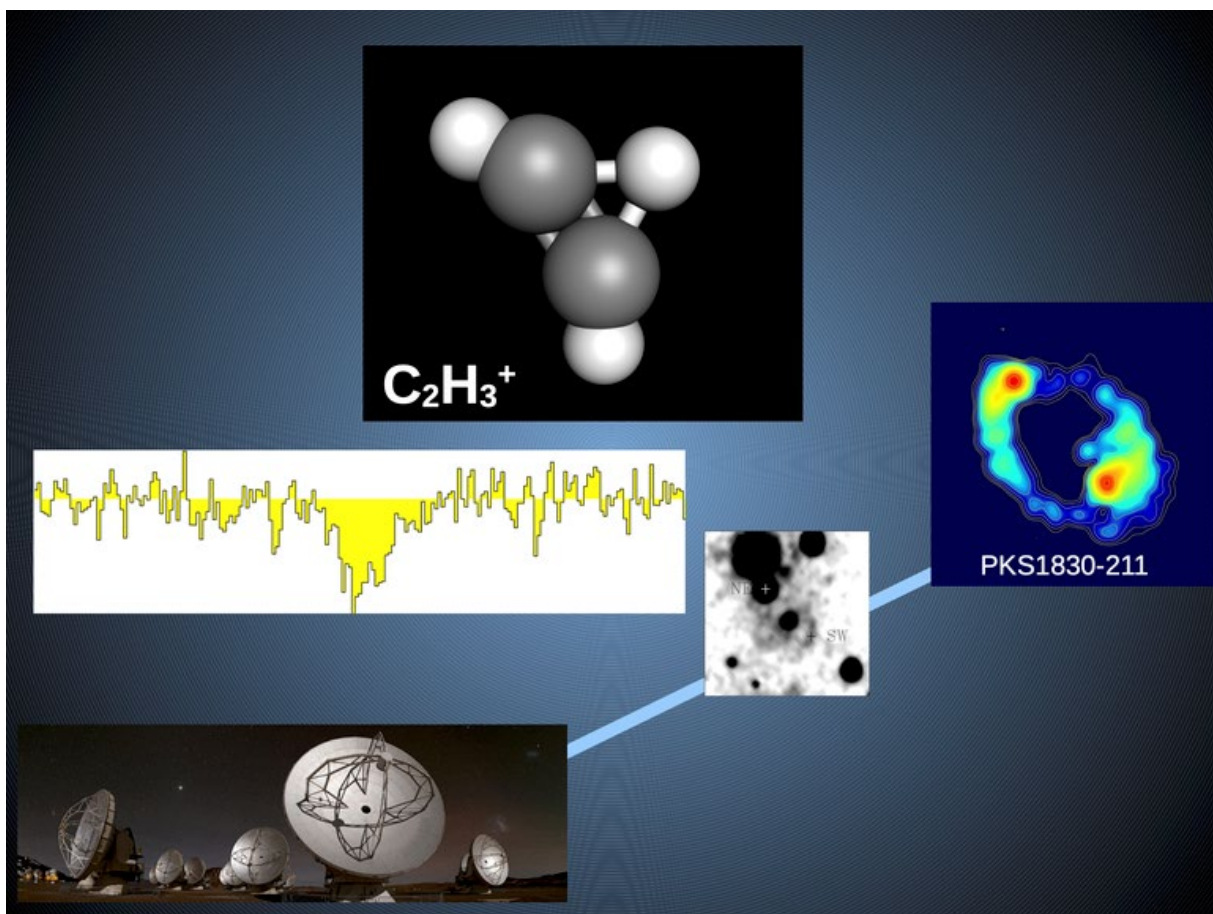


Figure: View of the molecule (created with MolView) and an absorption spectrum observed with ALMA in the line of sight of the quasar PKS1830-211. The quasar (here observed with the MERLIN interferometer at radio wavelengths) is lensed by a foreground spiral galaxy at $z=0.89$ (optical image from HST).

Reference: Muller, S., Le Gal, R., Roueff, E., Black, J., Faure, A., Guelin, M., Omont, A., Gerin, M., **Combes, F.**, Aalto, S.: 2024, Protonated acetylene in the $z=0.89$ molecular absorber toward PKS1830-211, *A and A*, in press, arXiv:2401.09975