

15 May 2017

Monday 3:00 pm

Physikalische Institute Köln

Seminarraum II

Zülpicher Straße 77 | 50937 Köln

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Molecules in a $z=0.89$ Disk Galaxy toward PKS1830-211

The $z=0.89$ molecular absorber toward PKS1830-211 is a unique source to investigate the gas properties in the disk of a distant galaxy, at a lookback time of about half the present age of the Universe. We have investigated the molecular contents along two independent sightlines through the galaxy, and use the molecules as tools to probe the physical conditions and excitation, including the molecular fraction and cosmic-ray ionization rate of atomic hydrogen using hydrides. We compare these two lines of sight to lines of sight in the Milky Way, and find surprising similarities and also some differences. We also use the molecules as cosmological probes, and we have obtained a precise and accurate measurement of the cosmic microwave temperature at $z=0.89$, stringent constraints on the constancy of fundamental constants, and measurements of isotopic ratios of C, N, O, S, Si, Cl, and Ar elements.

