

## The hottest gas in massive star forming regions. Observations of HC<sub>3</sub>N in hot cores

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### Abstract

Hot ( $T > 150$  K), dense ( $n > 10^7$  cm<sup>-3</sup>) and chemically very rich molecular cores are considered the cradle of massive stars. These regions are hidden behind large extinction ( $A_V > 20$  mag), and contain hot dust emitting in the 15 – 50  $\mu$ m range. This IR radiation excites the vibrational levels of HC<sub>3</sub>N (HC<sub>3</sub>N\*), whose abundance is enhanced due to evaporation of grain mantles. Therefore, HC<sub>3</sub>N\* is a very well suited molecule to study the kinematics of the dense and hot gas surrounding very young massive stars. We present spectra of the  $J = 5 - 4$  transition of HC<sub>3</sub>N\* and its isotopes HC<sup>13</sup>CCN\* and HCC<sup>13</sup>CN\* toward two galactic hot cores (Orion Hot Core and G10.47+0.03) carried out with the Green Bank Telescope in May 2012. The spectral coverage is 45 – 46 GHz ( $Q$  band receiver), the spectral resolution is  $\sim 2.5$  km s<sup>-1</sup>, and the angular resolution is 16". We have used the MADCUBA software to develop a LTE analysis that calculates the column density and the excitation conditions of the hottest gas in these massive star forming regions. Additional interferometric observations with higher resolution (1 – 5") show evidences of high excited gas outflowing from the cores.