

DETECTION OF EXTRAGALACTIC CH 9-CM EMISSION WITH THE NANCAY RADIO TELESCOPE

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As part as of an extragalactic CH 9-cm ground-state emission survey of OH emitters (megamasers) and absorbers, we report the detections of the 3335 MHz main line in M82 and of the 3264 MHz satellite line in the luminous far infrared (FIR) galaxies NGC 3079 and NGC 5793, obtained with the Nançay radiotelescope.

The CH emission profiles exhibit several separate velocity components which agree remarkably with the velocity features previously resolved in HI (21 cm), OH (18 cm) and H₂CO (6.2 cm) absorption profiles, suggesting a process originating in the same molecular clouds.

The main outlines of the excitation mechanism can be understood from previous calculations (Bouloy et al., 1984; Bujarrabal et al., 1984) which demonstrate the importance of collisions with atomic hydrogen to produce the overall inversion of the ground-state lambda-doubling of CH; they have also shown that the non-statistical distribution of population within the hyperfine levels arises through the interaction of CH with a FIR radiation field. The required condition of both strong FIR radiation field and continuum background source is fulfilled in strong IRAS sources such as NGC 3079 and 5793. We failed to detect CH emission in OH megamasers, such as NGC 4418 (Martin et al., 1988), which is the nearest one; the atomic HI content, obtained from 21-cm observations performed at Arecibo, seems to be too small to induce the overall inversion.

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