

## RADIO ASTRONOMY RECEIVERS AND A GAS REACTION CHAMBER FOR LABORATORY ASTROCHEMICAL SIMULATIONS.

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We present the current status of an experimental setup in which astronomical receivers and spectrometers are coupled to a reaction chamber to study the spectroscopy and chemical evolution of gas mixtures via their rotational emission lines. In a first proof of concept a small prototype reactor was placed in the beam path of the Aries 40 m radio telescope (Yebes, Guadalajara, Spain) facing the Q-band receiver operating in the 41-49 GHz frequency range providing 2 GHz bandwidth and 38 kHz resolution. Experiments with static samples or in flow mode, exposed to UV irradiation or an inductively coupled cold plasma were performed and the feasibility of the experiment demonstrated<sup>a</sup>. In a second phase, new receivers have been designed and built by the team of astronomers and engineers at the Yebes observatory, and are now coupled to a new larger reaction chamber in a dedicated laboratory. The new receivers cover the 31.5-50 GHz and 72-116 GHz bands quasi-simultaneously, with resolution  $\sim 38$  kHz. The performance and first results of the system will be discussed.

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<sup>a</sup>I. Tanarro et al. *Astron. & Astrophys.* 609, A15 (2018)