A NEW SPECTROMETER FOR HIGH RESOLUTION MEASUREMENTS OF TERAHERTZ TRANSITIONS IN COLD CARBON CLUSTERS

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We report on the setup of a supersonic jet spectrometer allowing measurements of rot-vibrational transitions in cold carbon clusters in the frequency range of 1.75 to 1.95 THz. The spectrometer consists of a multi reflection Herriott cell and uses a frequency tripled backward-wave oscillator source. It is the result of the combination of the existing Cologne Supersonic Jet Spectrometer for THz Application (SuJeSTA) with the 1.9 THz portable and stand-alone local oscillator of the German Receiver for Astronomy at Terahertz frequencies (GREAT). Due to the oscillator's frequency stabilization system, a spectral resolution of 13 kHz is achieved. An overview of the functional setup of the spectrometer and first measurements of the Q(10) bending vibration of the $^{12}C_3$ carbon cluster at 1935.87 GHz are reported. Ongoing projects for the measurement of submillimeter transitions in the $^{13}C_3$ and C_7 carbon clusters in the accessible terahertz region will be discussed.