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Fluorescence spectra of carbon monoxide isotopomers upon vacuum ultraviolet excitation

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Abstract content ** ** (Max 300 words)**
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This project is aimed at investigating the excitation and fluorescence wavelengths for carbon monoxide (CO) in the VUV region. VUV absorption lines of the CO in the interstellar space are observed in spectra of starlight, recorded by satellite based spectrographs. The weak spectral lines of forbidden transitions (FT) of $^{12}\text{C}^{16}\text{O}$ are critical to astronomy and astrophysics. CO is a prototype molecule; a numerical model of CO has been developed. However for a large number of the FT, experimental spectroscopic data is lacking.

The tunable VUV laser source allows recording of FT of CO. The narrow spectral bandwidth of the light (high spectral resolution and high spectral brightness) allows detection of the fluorescence from weakly absorbing transitions. The pulsed nature of the sources makes selective detection of the FT possible. Flow-cooling of CO in a supersonic jet makes it possible to do spectroscopy in conditions similar to conditions in space: collision-free and at temperatures down to a few Kelvin. By incorporating a scanning monochromator into the existing system it is possible to record the CO fluorescence spectrum upon VUV excitation. By analysing the fluorescence spectrum emitted when a single rovibronic energy state of CO is excited using the tunable VUV laser, experimental transition probabilities can be determined.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

NO

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YES

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