Contribution ID: **88** Type: **Študenti fyzika**

Fluorescence emission of CO induced by electron impact

Wednesday, November 26, 2025 11:11 AM (1 minute)

Emission spectroscopy is particularly valuable in space exploration, as it enables remote analysis of planetary atmospheres, cometary comas, and nebulas irradiated mainly by nearby stars. In comets, atomic sulphur can be stored inside the dust grains or as part of volatiles in the form of OCS, H_2S, SO, S_2 or CS_2 [1, 2]. The comet's sulphur inventory is closely linked to the pre-solar cloud and holds important information about the degree of reprocessing of the material in the solar nebula and during comet accretion. Fluorescence emission spectra of CS_2 were obtained after electron impact at several electron energies. The spectrum measured at 100eV shows a prominent emission from the CS_2^+ ($\tilde{A}^2\Pi_u$–$\tilde{X}^2\Pi_g$) emission band. A few features of the CS_2^+ ($\tilde{B}^2\Sigma_u^+$–$\tilde{X}^2\Pi_g$) emission band were detected below 300 nm, and in the near-infrared region, the emission lines of CI, CII, SI, and SII were identified. Meanwhile, the emission spectrum measured at 10eV shows solely the emission from neutral CS_2 ($1\Delta_u(V1B_2)$–$X^1\Sigma_g^+$) emission band, which spreads from 320~nm to 800~nm. There is no signal from ionized CS_2^+, as the ionization energy of CS_2 is 10.073eV [3].
This work was supported by the Slovak Research and Development Agency under the Contracts no. SK-PL-23-0050 and APVV-23-0522, Slovak grant agency VEGA under project nr. 1/0553/22. Funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I01-03-V04-00047.

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Session Classification: Poster session + káva: prezentácie študentov Fyzika

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