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[Abstract]

The role of excited states in Solar-Terrestrial Interactions: MOLESs consortium

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Abstract: Particles from the solar wind interact with molecules from the Earth's atmosphere creating ionized species (Marinković et al. 2025) and species with excited states. These states are responsible for Auroral formation, atmospheric chemistry and chemical species production or ozone depletion. The interactions involving excited states affect the overall energy balance and heating/cooling of the atmosphere (Campbell & Brunger 2018, Kirillov 2012). Long ago, the excited states of molecules have been reviewed in the three-volume series by Melvin Robin (1974, 1975, 1985). We are establishing the consortium of researchers aiming to rewrite the classic series and update data. New collection should include new laser methods, spectra in the solid (ice) phase and new theoretical calculations. These data have become so important in recent years for astronomical and space studies, whilst data for biomolecules are largely missing. We have established a webpage of MOLESs consortium (MOlecular Excited

State spectroscopy) https://www.moless-spectroscopy.org/project/ The MOLESs consortium will meet annually in Belgrade. Our intention is to publish data in both e-book format and on-line with recommended data sets. Data-sets will be uploaded and curated in specified databases within VAMDC (Virtual Atomic and Molecular Data Centre) portal https://vamdc.org/structure/databases/ (Dubernet et al. 2916, Albert et al. 2020, Vujčić et al. 2023, Srećković et al. 2025).

Keywords: molecules, excited states, MOLESs consortium

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