CNRS/GSMA

Contact person : Vladimir Tyuterev

Profile : **The Group of Molecular and Atmospheric Spectroscopy** (Groupe de Spectroscopie Moleculaire et Atmospherique , GSMA, UMR CNRS 6089) of the University of Reims, France, is the world recognized leader in the analysis and theoretical modeling of high-resolution spectra of ozone. The group has the unique experimental equipment for recording long-path Fourier transform spectra (FTS) in the infra-red and visible range, which over years has been used for producing very accurate data on line positions, intensities and line shape parameters for isotopologues of water, ozone, H2S, SO2, methane, CO2, acetylene and other molecules. These parameters are used as reference data in various databanks for atmospheric and astrophysical applications.

GSMA is a Member of the ANR Project: “CH4@Titan: Exhaustive study of methane absorption in Titan’s atmosphere through calculations and experiments” and a member of the GDR Project France-Russia-China “Absorption spectroscopy of molecules of interest in atmospheric sciences and planetology: from instrumental developments to global modeling and databases”

Information systems :

In collaboration with LTS of Tomsk IOA Institute, GSMA has developed the S&MPO user friendly information system specific for ozone data: “Spectroscopy & molecular properties of Ozone (http://ozone.iao.ru , http://ozone.univ-reims.fr) containing original Reims data in the infrared range. S&MPO is regularly updated including full reference lists classified according fields and allows a direct access and data retrieval. Contrary to traditional databases this information system contains information on molecular properties as well as programs and extended facilities for user applications involving calculations and experimental data. It also contains much more data on ozone then other sources. It includes original experimental cross section ozone data recorded in GSMA in the UV range, which have been recognized as the most accurate ones by the spectroscopic community.

GSMA also participated in SPECTRA atmospheric spectroscopy information system (GIP calculation code), developed in LTS Tomsk, Russia.

Contribution to databases for atmospheric and astrophysical applications:

GSMA is responsible (A.B.) for ozone input parameters to HITRAN /GEISA databases.

In collaboration with ULB the GSMA creates and maintains the most extended experimental “Reims-Brussels database” on high-resolution water lines in the range 4000-25000 cm^{-1}. GSMA provides accurate experimental data on the IUPAC project "A database of water transitions from experiment and theory " (PI: J.Tennyson).

Sofware development :

GSMA develops and explores with collaborators three types of programs:

“MULTIFIT” type code for simultaneous experimental spectra processing and accurate measurements of line parameters. GIP type codes for spectroscopic data reduction and modelling. S&MPO type information systems for simulation of absorption/emission.

Role in the project : (A) in the frame of the VAMDC the GSMA together with collaborators will host, maintain and regularly upgrade original data bases and information systems described above including: the ozone data, original experimental long-path experimental line parameters, and newly created database on hydrogen sulphide spectral parameters. (B) GSMA will contribute to the development of tools for the common access to these data, to the expertise and standardisation on molecular and atmospheric data**,** documentation and bibliography.

(C) GSMA will develop the software for the common use of the VAMDC network

in collaboration with IOA Tomsk, Russia aiming at: simulation of absorption / emission high and low resolution molecular spectra for atmospheric applications , visualisation and graphical representation of molecular data for the VAMDC network, intercomparison of various sources of molecular spectroscopy data.

Key persons :

Vladimir Tyuterev, Professor, responsible for the “CH4@Titan” project and “S&MPO” information system from the Reims side, member of the Journal of Molecular Spectroscopy

Editorial Board and of the scientific Committee of the HighRus Colloquium.

Expertise : Calculation and modelling of high-resolution spectra of atmospheric species; databases, information systems, molecular dynamics.

Role in VAMDC project : Contact person for GSMA, member of SAB, molecular expert, standards (JRA1), coordination of collaboration with Tomsk.

Alain Barbe, Professor, member of the Committee of the OHIO HRMS Colloquium and ASA / HITRAN workshops.

Expertise : Ozone spectroscopy, atmospheric applications

Role in VAMDC project : expert on atmospheric applications, evaluation (SA2)

Michael Rey, CNRS researcher, member of the SPECMO network Committee

Expertise : methane spectroscopy, global spectra calculations

Role in VAMDC project : programming & line list production (SA1), server for S&MPO database

Ludovic Daumont , Associate Professor (MC),

Expertise : experimental long-path spectroscopy of H_2O/HDO/D_2O

Role in VAMDC project : Reims-Brussel and IUPAC line lists (SA1), documentation (JRA1), evaluation (SA2)

Laurence Regalia-Jarlot , Accociate Professor (MC),

Expertise : experimental line parameters

Role in VAMDC project : software for simulation of absorption molecular spectra for atmospheric applications and comparison with observed spectra (JRA3)

Marie-René De Backer-Barilly, Professor ,

Expertise : molecular spectra assignment

Role in VAMDC project : upgrading S&MPO ozone line list (SA1), references and documentation (JRA1)

Lilian Joly, Accociate Professor (MC),

Expertise : laser applications, experimental equipment for space missions

Role in VAMDC project : documentation, evaluation of data for laser applications (SA2)

Xavier Thomas, CNRS Research Engineer,

Expertise : FTS instrumentation, spectra recording

Role in VAMDC project : software for simulation of atmospheric molecular absorption (JRA3)

Nicolas Dumelie, Engineer at University of Reims

Expertise : network, programming

Role in VAMDC project : Infrastructure for GSMA servers (network, storage, computing facilities) (SA1)

Maud Rotger, Professor

Expertise : software for databases, molecular data for ethylene

Role in VAMDC project : Graphical tools for the analysis and simulation of high-resolution molecular spectra (JRA3)

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