UP 12 Poster: Atmosphärische Spurengase und Aerosole: Instrumentelles

Zeit: Dienstag 14:00–16:00 Raum: C

UP 12.1 Di 14:00 C

Eine lineare Oktupolfalle zur Untersuchung von atmosphärischen Aerosolpartikeln mit Synchrotronstrahlung — •Björn Österreicher, Jan Meinen, Susanne Schulze und Thomas Leisner — TU Ilmenau, Inst.f. Physik, FB Umweltphysik,PF 100565, 98684 Ilmenau

Es wird eine elektrodynamische Linearfalle zur Untersuchung gespeicherter Nanopartikel-Ensemble am BESSY vorgestellt. In diese Falle sollen mittels einer aerodynamischen Linse über einen Quadrupolumlenker einfach negativ geladene Partikel verschiedener Größen (5...20nm) kontinuierlich eingespeist werden. In der Falle sammelt sich ein Teilchenensemble (10E8 Partikel) an und wird kolinearer definierbarer Synchrotronstrahlung ausgesetzt. Die Partikel werden so durch Innerschalenionisation und Auger-Zerfall umgeladen. Die nun positiven Teilchen verlassen kontinuierlich die Falle und werden mittels eines Daly-Detektors nachgewiesen ("Negativ-Neutral-Positiv-Prinzip"). Dieses Verfahren vermeidet Strahlenschäden, die bei der Untersuchung größerer gefangener Einzelpartikel auftreten können. Der Einfluß der Partikelgröße und -zusammensetzung auf die Form der NEXAFS-Spektren soll untersucht werden. Der Aufbau sowie erste Vorexperimente werden vorgestellt.

UP 12.2 Di 14:00 C

Improvement of the Detection Limit of Active-DOAS-Measurements by use of fibre coupled light source — •André Merten and Ulrich Platt — Institut für Umweltphysik, Heidelberg

In active DOAS-measurements, the minimum detectable optical density and thus the detection limit for trace gases are primarily determined by the spectral stability of the light source e.g. a Xenon high-pressure lamp. This is particularly important in spectral ranges where Xe-lines exist. Due to the large temperature gradient and turbulent flow inside the arc these spectral structures strongly vary with time and across the arc of the Xe-high pressure lamp. The use of fibre coupled Xe-light source together with a mathematical treatment reduces the residual structures up to a magnitude. With this new optical set-up it is possible to design a new type of long-path devices, which are easier to handle and show a larger flux of light.

UP 12.3 Di 14:00 C

New application software for Differential Optical Absorption Spectroscopy (DOAS) — •André Merten — Institut für Umweltphysik, Heidelberg

The opportunity offered by the Differential Optical Absorption Spectroscopy (DOAS) to do an automatic measurement and analysis of atmospheric trace gases has not been used because of the leak of adequate software. The requirements of modern measurement software were studied and a new, easier to handle DOAS-software based on Labview was developed, which can be used to monitor trace gases. It offers a complete control by Graphical User Interface, an automatic documentation mode and remote controlling via LAN or Internet. Passive as well as active DOAS devices (long path telescope, White Cell) can be controlled. As an example, an automatic trace gas monitoring system based on a long path telescope with modern LED light source, which can supervise air quality e.g. in urban as well in hazardous industrial areas is presented.

UP 12.4 Di 14:00 C

On the *in situ* measurement of H_2O isotopic ratios in the UT/LS by means of diode laser spectroscopy — •Christoph Dyroff[1], Andreas Zahn[1], Peter Werle[1,2], and Wolfgang Freude[3] — [1]Forschungszentrum Karlsruhe (IMK), Germany — [2]CNR-National Institute for Applied Optics, Florence, Italy — [3]Universität Karlsruhe (IHQ), Germany

Studies of the isentropic transport of water vapour into the lower stratosphere, and the vertical transport into the tropopause region (extratropics) or the tropical transition layer (TTL) will contribute to an improved understanding of the water vapour budget in the upper troposphere and in the lower stratosphere (UT/LS). This will help to assess the potential change of water vapour and its impact to the Earth's radiation budget and climate change.[1]

H_2O mixing ratios typically range between a few thousand parts per million by volume (ppmv) in the tropical troposphere to about 5 ppmv in much dryer lower stratospheric regions, giving rise to the need for a high dynamic range as well as very low detection limits of the order of 1×10^{-6} fractional absorbance to assess even high δD values around -70 %. Suitable spectral regions, ranging from the near-infrared to the mid-infrared, as well as the constraints of their selection are presented. An instrumental design along with calibration procedures for the *in situ* measurement of the isotopic ratios $\delta^{18}O$, $\delta^{17}O$, and δD in water vapour by means of tunable diode laser spectroscopy is given, and preliminary laboratory results are discussed.

[1] A. Zahn, J. Atmos. Chem., **39**, 303-325 (2001).