



The formation of coherence domains for aerosolized water molecules at alpine waterfalls – Part-1

P.Madl¹, P.Kolarž², E.Del Giudice⁵, A.Tedeschi⁴, A.Hartl³, M.Gaisberger³, W.Hofmann¹

¹Dep. of Material Research & Physics, University of Salzburg (AUT);

²Institute of Physics, Pregrevica 118, RS-11080 Belgrade (SR);

³Paracelsus Medical University, Institute for Physiology & Pathophysiology, A-5020 Salzburg (AUT);

⁴WHITE Holographic Bioresonance, Milan I-20103 (ITA);

⁵Istituto Nazionale di Fisica Nucleare, Via Giovanni Celoria, 16, Milan, I-20133, (ITA) & International Institute of Biophysics, D-41472 Neuss, (FRG);

Universität
Salzburg

Department of Materials Engineering and Physics – Division of Physics and Biophysics
Radiation and Environmental Biophysics Working Group

Abstract

The size distributions of ion clusters, their mobility and their intermediate progenies near waterfalls have been measured with three aspirated Gerdien Cylindrical Ion Detector (GCID) in combination with an Scanning Mobility Particle Sizer (SMPS). It was observed that the concentration of negative 0.9–6 nm ions was 2-3 orders of magnitude higher than at the reference points 100s of meters away from the waterfalls. Apart from a classical interpretation of the observed phenomenon, here we present a quantum electrodynamic approach to demonstrate that water in this size range is highly structured and coherent. With the help of some additional ultra-weak photon emission measurements (UWPED) of waterfall samples the significance of this approach could be demonstrated.

Fig.1: Composite plot of the size distribution of negatively charged particles as measured with distance from the waterfall in Krimml, Austria. Indices denote sampling locations at the falls (with the satellite view revealing the positions in the field). Size distribution till 2.5nm were recorded with the CDI, particles from 5-350nm have been obtained using the SMPS instrument; in-between GCID and SMPS measurements the interpolated region. For SMPS-measurements it was assumed that each particle carries a single charge.

Methods

The field setup included a triplet set of GCID - each assigned to a size channel of 0.9, 1.5 and 2.0nm and an SMPS that covers a continuous size range of 5.5 to 350nm. Coherence measurement were done in the lab using an UWPED.

GCID: It consists of three cylindrical and coaxially arranged electrodes. A fan ventilates the space between the centromost and middle electrodes. In the inter-electrode space air-ions of desired polarity and mobility are forced by the electric field across the electrostatic gradient to deliver their ion-related charges to a faraday cup electrometer (FCE).

SMPS: It is capable of measuring a particle size distribution of in-between 5 to 350nm. Particles are classified with an Electrostatic Classifier that utilizes electrical mobility to discriminate diameters. The concentrations are measured with the attached Condensation Particle Counter. In order to detect negative waterfall ions, the SMPS was operated without neutralizer, assuming that particles carrying single charges only.

Results

Fig. 1 shows the negatively charged particle size distribution for various distances from the falls. As shown in Fig. 4, coherent water cluster formation occurs below 100nm, thus measuring the nano-aerosols of the waterfall yields differences in delayed luminescence between frozen/liquid and shock-frozen nebulised water samples (Fig. 2). An almost four-fold gain (48-55 vs. 10-13cts/sec) was obtained when illuminating the shockfrozen nano-crystallized aerosol (both samples obtained at the waterfall, as well as for the lab-sample) in comparison with the liquid and fridge-frozen samples. An even better reading has been obtained with the untreated lichen sample (Fig. 3). The readings between the healthy and the "damaged" or stressed (5% vinegar treated) colony are significant. The healthy decay line reveals an initial UWPED count of almost 80 E³cts/sec. The UWPED-count-rate of the same colony treated with vinegar collapsed by almost two orders of magnitudes to about 100cts/sec – a result well in line with the prediction as stated by coherence theory (Rattemeyer, 1978). This lower count rate is characteristic for more decoherent systems. As already outlined by Scholz et al. (1988), the decay-kinetics after excitation should follow a hyperbolic rather than an exponential law. While the latter is characteristic for chaotic processes, the former is characteristic for coherent systems.

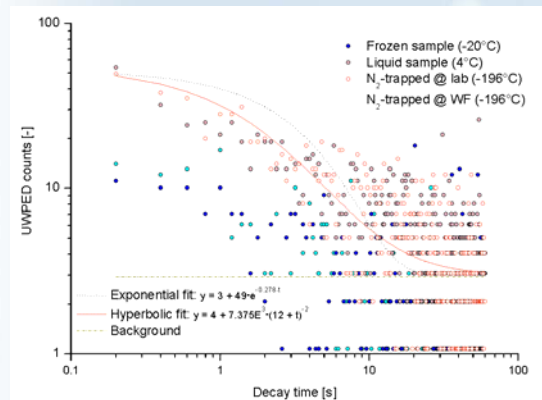
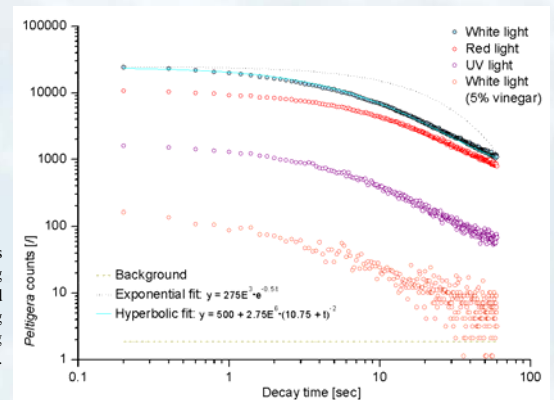


Fig. 2: UWPED-readout for a liquid water sample involving two N₂-shock-frozen samples and a rockpool sample (kept in the freezer) – all samples taken at the falls. For sake of clarity, the superimposed hyperbolic trend is shown along with the less-fitting exponential trend line only for the N₂-trapped @ lab (-196°C) sample.

Fig. 3: UWPED-readout for the lichen *Peltigera* sp. using various illumination wavelengths. Decoherence was induced by exposing it to a 5% vinegar aerosol. For sake of clarity, the superimposed hyperbolic trend in decay is shown along with the poorly-fitting exponential trend line (shown only for the trial employing illumination with white light).



Interpretation

According to Fig.1, peak concentrations are found in the 0.9-6 nm range. Therein, clusters of particles are subject to effects of quantum electro dynamics. Here, water reveals extreme features since the coherent oscillation connects two electronic configurations (Arani et al., 1995). The first one is the ground configuration where all electrons are tightly bound. The second one is the excited configuration state that corresponds to an energy threshold of $E = 12.06\text{eV}$ – that is only 0.54eV below the ionization threshold of 12.60eV (Fig. 5). This implies that for each molecule involved in the formation of a Coherence Domain (CD) there is one electron so loosely bound to be considered almost free; that is, the formation of CDs provides a reservoir of free electrons.

Coherence arises out of the electromagnetic fluctuations of the quantum vacuum and from the exchange of radiation at the natural photo-absorption resonances of water molecules. Such coherence is confined to domains whose size is different for molecules and electromagnetic fields (EMF). The field is trapped in a region whose diameter corresponds to $2 \cdot r_{CD}$, the wavelength of the spectral line involved ($r_{CD} = \lambda/2$). The involved spectral line is in the far-UV, close to the ionisation potential of water (Fig. 5). CDs obtained in this way are the liquid droplets produced by the condensation of water vapour. Permanent coherence becomes established in water and gives rise to a long-range-order within domains 75nm in diameter (Fig. 4).

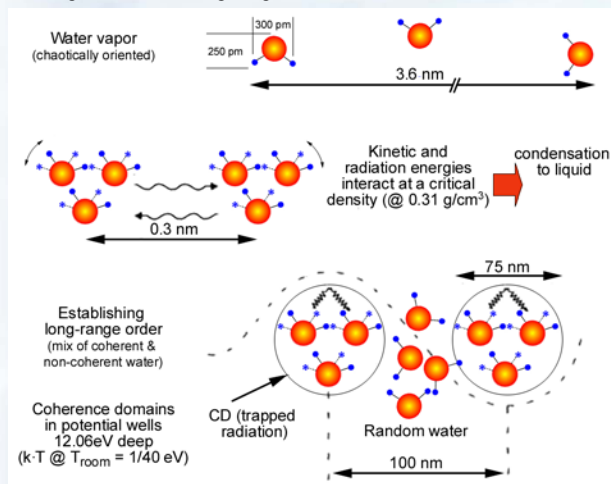
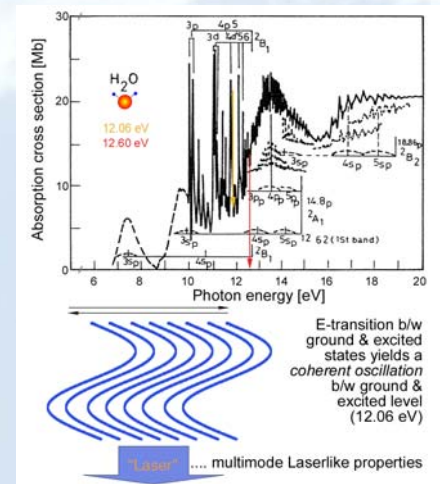


Fig. 4: Formation of coherence domains (CDs) of aerosolized water molecules. The free-floating dipoles start to feel mutually attracted and establish coherent resonance clusters that result in the formation of 75 nm large CDs in which molecules resonate unisono and in phase. CDs themselves become entrapped by the newly formed coherent polarizing field and reveal a characteristic wavelength of about 100nm. The formation of CDs is a fundamental property of liquid water and unlike the laser, no energy pumping is required to establish coherence (Preparata, 1995).

Fig. 5: Formation of the multimode laser properties within a CD as a result of the pumping mechanism, synchronized excitation and relaxation patterns between the ground level and excitation at 12.06eV of the involved water molecules.



Conclusion

The investigation carried out at several waterfalls in Central Europe opened up some new and interesting aspects in waterspray electrification. The electrostatic field gradient with its prevailing negatively charged aerosols and their minute size (<30nm) facilitate formation of Coherence domains (CD). As will be outline in Part-2, co-resonating molecules can join water-CDs and participate in the coherent dynamics as they can receive energy in a collective way and in one stroke just as in multimode lasers. CD-water reveals peculiar properties as density anomaly, altered viscosity / surface tension and a different heat capacity (Willis et al., 1969).

Acknowledgements: The research project was funded by the Grossglockner Hochalpenstrasse AG and partially also by MES Serbia No: 171020.

References

- Arani R., Bono I., Del Giudice E., Preparata G. (1995). QED Coherence and the Thermodynamics of Water. *Int. J. Mod. Phys. B.* 9: 1813-1841.
- Buzzacchi M., Del Giudice E., Preparata G. (2002). Coherence of the glassy state. *Int. J. Mod. Phys. B.* 16: 3761-3786.
- Rattemeyer M. (1978). Modelle zur Interpretation der ultraschwachen Photonen-Emission in biologischen Systemen. Diploma thesis, Centre for Theoretic & Exp. Radiology, University of Marburg/Lahn - FRG, Chapter 2
- Scholz W., Staszkiwicz C.I., Popp F.A., Nagl W. (1988). Light-Stimulated Ultraweak Photon Reemission of Human Amnion Cells and Wish Cells. *Cell Biophysics* 13: 55-63.
- Preparata G. (1995). Dynamics and Thermodynamics of Water; in: QED Coherence in Matter. *World Scientific*, Singapore; p. 195-217.
- Willis E., Rennie G.K., Smart C., Pethica B.A. (1969). Anomalous Water. *Nature* 222 (3): 159-161.