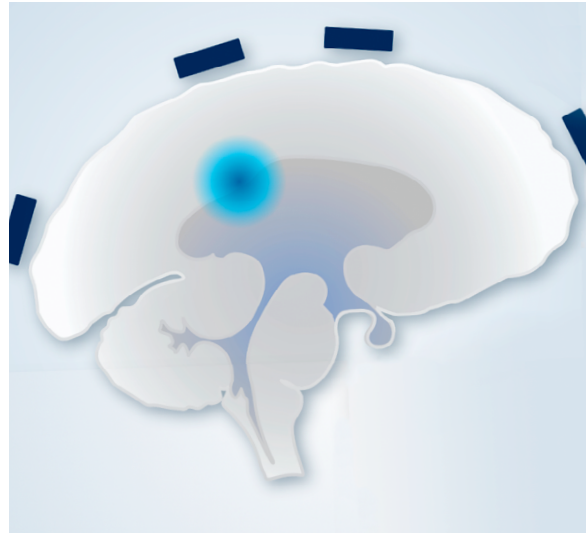


Dear Z43 Partners, Friends, and Followers

This is certainly a year we won't forget in a long time – it has forced us to put a lot of things on hold both in business and in our private lives. The COVID-19 crisis has presented many challenges, disrupting the ordinary but also inspiring innovative ideas concerning dealing with the new normal. We hope that you will be able to be with your loved ones, wind down, and recharge over the holiday season. We wish you a happy and prosperous 2021!

RESEARCH

Investigational Device for Temporal Interference Research



At the end of last year, [TI Solutions AG](#) was founded at Z43 by the initiative of Nir Grossman (Imperial College London), Ed Boyden (MIT), Alvaro Pascual-Leone (Harvard Medical School), Esra Neufeld and Niels Kuster (both of IT'IS), and Henrich Kisker (NFT) with the aim of achieving a breakthrough in therapeutical applications for temporal interference (TI) stimulation.

TI is a novel noninvasive method that uses scalp electrodes to apply interfering high-frequency electrical currents for deep brain

stimulation. The first objective of the company is to promote research by providing high-quality and flexible stimulation devices and treatment-planning tools. Lots of progress has been achieved in the last few months and the development of the feasibility prototypes, outsourced to IT'IS and SPEAG, is already at an advanced stage.

MEASUREMENT

Release of cDASY6/8 Module WPT V1.0



The full version 1.0 of cDASY6/8 Module WPT, designed to demonstrate compliance with the basic restrictions of any magnetic source from 3 kHz to 4 MHz with maximal precision, has now been released. It is fully compliant with IEC/IEEE63184 PAS and empowers manufacturers to certify devices with minimal overestimation (up to 70 dB more currents than if compared to the reference levels).

Z43 SOCIAL

Alterations to the IT'IS Board

IT'IS welcomes three new members to its Board of Directors: Prof. Beatrice Beck Schimmer, Vice President Medicine at the University of Zurich, CH; Prof. Alex Dommann, Head of the "Materials meet Life" Department and member of the Board of Directors at Empa, CH; and Prof. Alvaro Pascual-Leone, Professor of Neurology, Harvard Medical School, USA. All three new members have a strong focus on advancing biomedical research and bring extensive expertise, experience, and important and much needed know-how to the board.

We would also like to express our sincere gratitude to our three retiring longtime members Dr. Mirjana Moser, Prof. Heinrich Walt, and foremost Prof. Peter Niederer, who has guided the Foundation as President through the past 15 turbulent years.



MEASUREMENT

FCC Requirements for 6–10 GHz: Our Solution

SPEAG, with the support of IT'IS, responded immediately to the new interim procedure for radiofrequency exposure evaluations of U-NII 6–7 GHz band portable devices of the Federal Communications Commission (FCC) presented at the last TCB workshop on October 14, 2020. [The new Application Note](#) "Interim Procedures for Devices Operating at 6–10 GHz" describes in detail for DASY users how to determine absorbed and incident power density according to these new rules.

MEASUREMENT

DAK-TL2: Our 2nd Generation Dielectric Measurement Kit



This new product is based on an innovation of the computational electromagnetic group of the IT'IS Foundation, namely a novel high-performance solver that directly determines the dielectric parameters from measured S_{11} values in quasi real time – instead of using pre-computed lookup tables. This makes the system not only more precise but also more flexible.

SIMULATION

Release of Sim4Life V6.0 and SEMCAD X V19.0



The releases of Sim4Life V6.0 and SEMCAD X Matterhorn V19.0 come with two major advances: (i) the new Neural Sensing Package allows simulation of measurable electrical signals of neural activity in heterogeneous, anisotropic, dielectric environments and (ii) the direct import of the magnetic fields measured with DASY6/8 Module WPT as the incident field for the simulations, eliminating the need for WPT device validation.

Details and the list of the other new features can be found [here](#).

RESEARCH

PUBLICATIONS

Theoretical investigation on broadband THz deflectors for femtosecond electron beam diagnostics

X. Liu, et al., 2020, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, 986, 164722, doi: 10.1016/j.nima.2020.164722 (online 12 October 2020)

Quantification of Clinically Applicable Stimulation Parameters for Precision Near-Organ Neuromodulation of Human Splenic Nerves

I. Gupta, et al., 2020, Communications Biology, 3, 577, doi: 10.1038/s42003-020-01299-0 (online 16 October 2020)

Association between estimated whole-brain radio frequency electromagnetic fields dose and cognitive functions in preadolescents and adolescents

A. Cabré-Riera, et al., 2020, International Journal of Hygiene and Environmental Health, 231, 113659, doi: 10.1016/j.ijheh.2020.113659 (online 19 November 2020)

Transmission Coefficient of Power Density into Skin Tissue Between 6 – 300 GHz

A. Christ, et al., 2020, Radiation Protection Dosimetry, ncaa179, doi: 10.1093/rpd/ncaa179 (online 4 December 2020)

Radiofrequency electromagnetic fields from mobile communication: Description of modeled dose in brain regions and the body in European children and adolescents

L. E. Birks, et al., 2020, Environmental Research, *in press*

Towards Blood Flow in the Virtual Human: Efficient Self-Coupling of HemeLB

J. W. S. McCullough, et al., 2020, Interface Focus, *in press*

Non-invasive Suppression of Essential Tremor via Phase-Locked Disruption of its Temporal Coherence

S. Schreglmann, et al., 2020, Nature Communications, *in press*

Tl stimulation to restore breathing after opioid overdose and SCI

M. D. Sunshine, et al., 2020, Communications Biology, *in press*