



Seminar on Non-Ionising Radiation (NIR)

May 14th, 2019, 09h00, CERN Building 40 S2-B01 "Salle Bohr"

Programme

- 09h00 CERN NIR sources (S. Agosta IT/CS and F. Szoncsó HSE/DI)
- 09h30 Technical and physiological hazards of static magnetic fields (M.Buzio TE/MS)
- 10h00 Coffee at the building 40 cafeteria
- 10h30 Physiological hazards of low frequency alternating magnetic fields, (W. Grommes, DGUV)
- 11h00 Physiological hazards of radio frequency exposure (F. Szoncsó HSE/DI)
- 11h30 Information and discussion session on specific topics raised by the audience (all experts)
- 12h15 Speakers' lunch in glass box of restaurant 1

Abstracts

NIR sources at CERN

Introduction CERN NIR sources comprise intentional RF radiators, RF-leakage, and ELF. LASER, ultrasound and ultraviolet radiation will not be treated. Facts, limits and protective measures are given.

First Part Introduction to mobile/TETRA/Wi-Fi indoor and outdoor services, mentioning output power and radiation patterns, limits and regulations, and measurement campaigns.

Second Part NIR sources in the extremely low frequency domain (ELF) will be shown. The characteristic properties of these sources are given, plus some prominent locations identified. Explained will be the kinds of equipment likely to radiate, and some basic measures to curb leakage radiation.

Safety aspects of strong DC magnetic fields

First we address the technical hazards linked to strong magnetic field sources, primarily mechanical forces on ferromagnetic items and the well-known "projectile effect". We then discuss the impact of the field on various items of equipment and instrumentation, as well as other hazards related to working inside or in the vicinity of magnets. Next we address the direct influence of a magnetic field on human health, with particular focus on the interaction with prostheses of various types. To conclude, we briefly review legislative aspects.

Physiological hazards of low frequency alternating magnetic fields

This presentation gives an overview about the EMF requirements and Directives. The physiological hazards and effects through electromagnetic fields in human bodies and medical implants are given. Bio-EM Simulation Software covers the reaction of electromagnetic fields with different human body models (Voxel Phantoms) for men, women, pregnant woman, children and infants. The presentation includes also EMF measurement methods with suitable measurement equipment. The recent development of high power wireless chargers (eCar) in the kW-range requires simulations of strong fields in order to establish safety measures.

Physiological hazards of radio frequency exposure

The physiological effects of radio frequency exposure will be covered. Whilst the omni-present extremely low level exposure has no physiological consequences high level CW and pulsed exposure rises the likelihood to develop malicious physiological effects. The latest results in this domain will be summarised.