Technical Presentation Session
Sponsored by IAS Young Professionals and Alumni of CMD

POWER AND ENERGY

Keynote Lecture

Tony Luija Chen, PhD, Lecturer, Department of Electrical and Electronic Engineering, The University of Manchester

Biography: Dr Chen received his BEng degree in Electrical and Electronic Engineering and PhD degree in High Voltage Engineering from Cardiff University, UK, in 2012 and 2015, respectively. Following his PhD, he worked for Western Power Distribution and moved across the distribution business in the field of Primary System Design and Network Servicing from 132 kV down to LV. In 2017, Dr Chen joined The University of Manchester as a Lecturer in High Voltage Engineering. He was appointed as the Director of Business Engagement in Transport for the Faculty of Science and Engineering at The University of Manchester in 2020.

Dr Chen has been involved in the research of gas and solid dielectrics and their applications and is the lead academic responsible for the research work on SF_6 alternatives at The University of Manchester. He is actively involved in Cigré Working Group B3/A3.59: Guidelines for SF_6 end-of-life treatment of T&D equipment (>1 kV) in substations. He is also Member of the IET and the IEEE.

Application of Alternative Gases in Retro-filling SF_6-insulated High Voltage Equipment

Power Point Presentation, 30 min

Abstract:
Sulphur hexafluoride (SF_6) is widely used in modern transmission and distribution networks due to its outstanding dual qualities: dielectric insulation and arc interruption. SF_6 is chemically inert, non-toxic and non-flammable, and is the main gas medium used in gas insulated switchgear (GIS), lines (GIL) and busbars (GIB). However, SF_6 is identified by the Kyoto Protocol as a highly potent greenhouse gas. The use of SF_6 in the electrical industry is yet to be prohibited due to the lack of a viable alternative. There is a growing research interest into alternative gases with much lower environmental impact and comparable electrical properties to SF_6. While a lot of current research focuses on developing state-of-the-art high voltage equipment specifically designed for alternative gases, this work investigates the feasibility of retro-filling existing SF_6-designed equipment. For the power industry, retro-filling the existing SF_6 equipment with an environmentally friendly solution would represent a more economical and time saving solution to phase out the usage of SF_6. To tackle this research, a full-scale gas insulated demonstrator rated for 420/550 kV was constructed at Manchester. Type tests in accordance to IEC 62271-204 showed that an environmentally friendly gas mixture has passed all the required voltage levels as SF_6. The research findings in this work are an encouraging step towards a technically viable SF_6-free retro-fill solution for existing GIL / GIB installed for the 400 kV transmission network in the UK.

.

Lectures of IAS YPs and CMD Alumni

Richard Cselko, PhD (BUTE), Senior lecturer, Budapest University of Technology and Economics (BUTE), Hungary / Founder Chair of the BUTE IAS/PES Joint Student Brach Chapter, Currently Advisor / IAS CMD | Student Technical Conference Committee

Biography: Masters and PhD degree in electric power engineering at the Budapest University of Technology and Economics. Currently Senior lecturer and the vice-head of the High Voltage Laboratory. Extensive experience in insulation diagnostic techniques, design of high voltage tests and components, partial discharge measurements and statistics based maintenance planning applied to industrial power systems, electrical safety of linemen on high and medium voltage power lines. Outstanding leader of his students, many of them receiving prestigious national and international awards. Experience in accredited testing of high voltage assets according to the ISO 17025 standard. Broad experience in organizing international scientific conferences and a broad volunteering activity in national and international level.

Basics of Partial Discharge Diagnostics

Power Point presentation, 30 min

Partial discharges (PD) occurring in high voltage assets are a sign of insulation defects that may lead to actual failure. Keeping PD levels at minimum is therefore a requirement during factory testing and a method of diagnostic testing. Evaluation of PD measurement data needs the understanding of the discharge phenomenon on the spot, the propagation of the signal and the measurement device itself, which are all tackled in the presentation.

.