

ANDREAS DERNFALK

Andreas has more than 20 years' experience in high voltage technology and his specialist field covers outdoor insulation and failure cause investigations. He has been involved in the development of procedures for ice and snow testing, dimensioning and diagnostic testing of outdoor insulators, with special focus on composites. Andreas has also worked with insulation coordination and performed several studies related to conversion of OHLs from AC to DC operation. His experience also includes dielectric spectroscopy measurements on transformers.



MAIN FIELDS OF COMPETENCE

- Insulator selection and statistical dimensioning.
- Test methods and diagnostics of ceramic and composite insulators.
- Failure cause investigations of HV equipment, including cable accessories and insulators.
- Insulation coordination studies.
- AC-DC conversion of OHLs.
- Power quality measurements.

WORK EXPERIENCE

2017- -	Independent Insulation Group Sweden AB , Expert
2005- 2017	STRI AB , Ludvika, Sweden. Senior Specialist Manager Lines and Substations
2004-2005	Chalmers University of Technology , Gothenburg, Sweden. Researcher at Department of Materials and manufacturing technology.
1999-2004	Chalmers University of Technology , Gothenburg, Sweden. PhD-student at Department of Electric power engineering.
1991-1998	Vattenfall AB , summer jobs working with maintenance of high voltage apparatuses.

EDUCATIONAL DEGREES

2004	PhD in Electrical Engineering Chalmers University of Technology, Göteborg, Sweden, Sept 1999 – Oct 2004
1999	MSC in Electrical Engineering Chalmers University of Technology, Göteborg, Sweden, Aug 1995 – Sept 1999

MEMBERSHIP OF TECHNICAL COMMITTEES

2022 -	CIRGRE WG C4.69: Lightning response of tower-footing electrodes of overhead transmission lines – methods of measurement
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LANGUAGES

Swedish (native), English (professional level)

Recent projects

- 2023 Measurements of electromagnetic disturbances from HVDC cables.
- 2023 Condition assessment of 400 kV cables through PD-measurements
- 2022- Insulation coordination of wind farm (several projects)
- 2023 Assessment of vacuum breaker switching transients in 16.7 Hz network
- 2022- Investigation of problems with HVDC voltage dividers including measurements on site
- 2022 Resonance study of 16.7 Hz grid
- 2022 Strategy for condition assessment of EHV cable systems
- 2022- Insulation coordination of wind farm (several projects)
- 2021- Measurement of harmonics at transmission level (ongoing, 10+ stations). Includes planning, execution, and setting up power quality instruments.
- 2021/22 Study on protection of buried HVDC cables from nearby lightning strikes (3 projects)
- 2021 Flicker/harmonic investigation
- 2021/22 Consequences of cablification of regional network considering, e.g., power quality aspects
- 2021 Laboratory tests of 330 and 500 kV composite insulators
- 2021 Laboratory tests of 400 kV composite insulators
- 2021 Failure cause investigation of 36 kV cable joints (several projects)
- 2021 Insulation coordination of wind farm (several projects)
- 2020 Influence of sea salt on 145 kV OHL performance
- 2020/21 Benchmarking of composite insulators
- 2020 Comparison of composite insulator sealing technologies
- 2020 Study on protection of buried HVDC cables from nearby lightning strikes
- 2020 PD-measurements on MV cables in service
- 2020 Ultrasonic inspection of porcelain insulators
- 2020 Study of cable sheath voltages and selection of sheath voltage limiters
- 2020 Mechanical tests of composite insulators
- 2019 Insulation coordination 400 kV line
- 2019 Third-party assessment of failure cause investigation and proposed corrective measures in cable project
- 2019 Measurements of harmonics and supraharmonics in 70 kV-network, and study on resonances.
- 2019 Feasibility study on power supply harvesting energy from OHL
- 2019 Insulation coordination study (LOV) for 245 kV-GIS

- 2018 Calculation of cable screen currents and associated temperature rise (145 kV system)
- 2018- Insulation coordination study (LOV and SOV) for nuclear power plant
- 2017/19 R&D project on quality of composite insulators (joint project of 9 TSO's)
- 2018/20 R&D project IceBox on methods for prevention and removal of ice on OHLs
- 2018/19 Inspection and testing of composite insulators with biological growth
- 2018 Required minimum clearance from HVAC and HVDC cables considering induction in external objects.
- 2018 Recommendations for the dimensioning of HVDC cable terminations with respect to pollution
- 2018 Feasibility study on fibre optic measurements (Distributed Temperature Sensing) for dynamic line rating
- 2018 DC pollution flashover test of composite insulator
- 2018 Calculation of magnetic field from OHL
- 2018 Assessment of lightning performance of new 400 kV line tower
- 2018 Failure cause investigation of 36 kV cable terminations
- 2018 Failure cause investigations of 145 kV instrument transformers
- 2017 Measurements and analysis of harmonics and supraharmonics (>2.5 kHz) related to the Swedish railway.
- 2017/18 Failure cause investigation of composite line insulators (several projects)
- 2017 Recommendations regarding creepage distance for insulator strings in 420 kV substation
- 2017 Assessment of need for temporary grounding of OHL towers at construction close to parallel lines (e.g., considering induction)
- 2017 Investigation of two failed 33 kV cable terminations
- 2017 Insulation coordination study for 145 kV gas-insulated substations
- 2017 Recommendations regarding selection of RTV-coatings
- 2017 Selection of design creepage distance for 420 kV substation
- 2017 Third party assessment of transformer failure root cause investigation
- 2017 Specification of requirements for sensor to be used on 420 kV earthing switches
- 2017 Insulation coordination study 420 kV AIS
- 2017 Insulation coordination study 145/6/0,5 kV substation
- 2016/17 Field measurements and analysis of power quality for the Swedish railway system following the installation of new static converters.
- 2016/17 Minimum distance requirements for installations in the vicinity of HVAC cable systems considering induction in external objects.
- 2016 Feasibility study for AC-DC conversion of 400 kV OHL
- 2016 Development of test program for evaluation of HVDC live line work procedures and tools. Laboratory testing.
- 2016 Failure investigation of 36 kV cable termination
- 2016 Wet snow testing of composite insulators
- 2016 Failure investigation of 36 kV cable joint
- 2016 Practical evaluation of instrument for PD measurements on cable accessories
- 2015 Practical evaluation of sensor concept for earthing switch
- 2015 Estimation of current unbalance on bipolar HVDC overhead lines
- 2015 Test program for salt fog testing of HVDC porcelain cable termination

- 2015 Creepage distance requirements for 500 kV OHL
- 2015 Feasibility study for conversion a 400 kV AC OHL to DC
- 2015 Insulation coordination of wind park
- 2014/15 Guidelines for inspection and documentation of damaged or failed insulators
- 2014/15 Guidelines for handling of composite insulators
- 2014 Dimensioning of insulators of 500 kV HVDC transmission line with respect to pollution
- 2014 AC to DC transmission line conversion handbook
- 2014 Combined ice/pollution full scale HVDC test of insulators
- 2014 Feasibility study of upgrading 230 kV AC lines to HVDC
- 2014 Calculation of magnetic field from cable system
- 2013/14 Insulation coordination study 420/130/20/6 kV substation
- 2013/17 Prototype for indication of 420 kV-earthing switch position
- 2013 Mechanical failing load test on porcelain post insulators
- 2013 Expected pre-waring time at PD measurements on MV cable accessories
- 2012 Investigation of failures of light guides for HVDC valve
- 2012 Root cause investigation of failed 220 kV cable joint
- 2012 Feasibility study of uprating Vattenfalls's 40 kV lines to a higher voltage level
- 2012 PD measurements on rectifiers for electro filter
- 2012 Recommendations for installation of HVDC cables parallel to existing MV cables
- 2012 Feasibility study on ultrasonic methods for detection of cracks in energized porcelain insulators
- 2012 Laboratory test of conductors with potential anti-iced coatings
- 2011 Voltage test of 220 kV cable removed from service. Localization of PD sources.
- 2011 Field measurements to verify phase location on energized 420 kV OHLs
- 2011 Ice and audible corona test of OHL conductors with different coatings
- 2011 Snow tests of composite insulators
- 2010 Mechanical failing load test on porcelain post insulators (several projects)
- 2010/- Root cause investigations of MV and HV cable accessories (+20 projects)
- 2009 Development of laboratory test for generation of wet and packed snow with defined conductivity
- 2009 After service evaluation of insulators installed on the Cabora Bassa – Apollo HVDC line
- 2009/10 Development of laboratory test for generation of wet and packed snow with defined conductivity
- 2009 Pollution performance curve of line insulator for DC
- 2008 Development of the guidelines for IR/UV inspection of composite insulators
- 2008 Development of laboratory test intended for generation of snow with defined properties
- 2008 Improvement of performance of 550 kV circuit breaker in humid environments (laboratory testing)
- 2008 Investigations of broken insulators (several projects)
- 2007/08 Optimization of line composite insulators intended for ice & snow environment
- 2007 Mechanical failing load test on porcelain post insulators
- 2007 Snow-puncture test of circuit breaker with composite insulators

- 2007 Salt fog and solid layer tests of 550 kV transformer bushing
- 2007/- Electric field calculations (FEM) for field grading of composite line insulators (several projects)
- 2006/07 Development of requirements on RIV-levels for porcelain cap-and-pin insulators
- 2006/07 Methods for detection of porcelain support insulators with potentially dangerous cracks
- 2005/09 Temperature rise tests of 245 kV, 420, 550 kV transformer bushings (several projects)

List of publications

Dernfalk A.D., Richter S., Blennow H.J.M., "Optical sensors based on liquid crystals for measuring DC fields in air", In Proc. of Nordic Insulation Symposium 01, pp. 97-104, Stockholm, Sweden, 11-13 June, 2001

Larsson, S. Kröll and A.D. Dernfalk, "Laser-Induced fluorescence surface spectroscopy - a candidate for the characterisation of high-voltage insulator surfaces", In Proc. of Nordic Insulation Symposium 01, pp.133-140, Stockholm, Sweden, 11-13 June, 2001

A.D. Dernfalk and S.M. Gubanski, "Use of digital image analysis for studying biological contamination on nonceramic insulators", In Proc. 12th International Symposium on High Voltage Engineering, pp. 599-602, Bangalore, India.

S.M. Gubanski, A.D. Dernfalk, M.A.R.M. Fernando, "Performance of different insulator designs in tropical environments and diagnostic possibilities", In Proc. Cigré International Symposium on "Behaviour of Electrical Equipment and Components in Tropical Environments", Paper No. 200-18, Cairns, Australia.

A. Larsson, A. Roslund, A.D. Dernfalk, S.M. Gubanski, "Remote and non-intrusive diagnostics of highvoltage insulator materials using laser-induced fluorescence spectroscopy", In Proc. IEEE Conference on Electrical Insulation and Dielectric Phenomena, pp. 428-431, Kitchener, Canada.

Larsson, A. Roslund, S. Kröll, A.D. Dernfalk. "In-situ diagnostics of HV outdoor insulators using laserinduced fluorescence spectroscopy", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 9, pp. 274-281, April.

A.D. Dernfalk, "Image Analysis for Diagnostics of Insulators with Biological Contamination", Lic. thesis, Chalmers University of Technology, Gothenburg, No. 450L, Sweden.

A.D. Dernfalk, M. Bengtsson, R. Grönlund, M. Sjöholm, P. Weibring, H. Edner, S.M. Gubanski, S. Kröll and S. Svanberg, "Laser-induced fluorescence spectroscopy for detection of biological contamination on composite insulators", In Proc. 13th International Symposium on High Voltage Engineering, Delft, Netherlands, 2003

A.D. Dernfalk, "Diagnostic Methods for Composite Insulators with Biological Growth", PhD thesis, Chalmers University of Technology, Gothenburg, Sweden, ISBN 91-7291-501-3.

- A.D. DERNFALK and S.M. GUBANSKI, "Techniques for estimation of biological contamination on insulators using image analysis", In Proc. IEEE Conference on Electrical Insulation and Dielectric Phenomena, pp. 659–662, Boulder, Colorado, USA.
- A.D. DERNFALK and S.M. GUBANSKI, "New laser technique for diagnostics of composite insulators", Insulator News & Market Report, Vol. 12, No. 3, pp. 78-83.
- A.D. DERNFALK and S.M. GUBANSKI, "Image analysis in insulator diagnostics", Insulator News & Market Report, Vol. 12, No. 4, pp. 36-40.
- J. BLENNOW, K. WALCZAK, A. DERNFALK, B. GARCIA, A. BARTNICKI, S. GUBANSKI, O. SAMUELSSON, U. KARLSSON, "Comparative study of dielectric spectroscopy measurements and analyses of oil and paper samples from a transformer undergoing repair", In Proc. of 19th Nordic Insulation Symposium, Trondheim, Norway, June 13-15.
- J. BLENNOW, A. DERNFALK, K. WALCZAK, C. EKANAYAKE, P. KOESTINGER, L. KARLSSON, U. GÄFVERT, S. GUBANSKI, A. BARTNICKI, "Sequential Comparative Study of Dielectric Response and Analyses of Oil and Paper from a Power Transformer Undergoing Repair", In Proc. 14th Int. Symp. on High Voltage Eng., Beijing, China, August.
- S. GUBANSKI, A. DERNFALK, S. WALLSTRÖM and S. KARLSSON, "Biological contamination of insulators: Influence on performance and diagnostic techniques to assess the problem", to appear in Proc. of 2005 Insulator world congress and exhibition on insulators, arresters and bushings
- M. BENGTSSON, R. GRÖNLUND, M. SJÖHOLM, Ch. ABRAHAMSSON, A.D. DERNFALK, S. WALLSTRÖM, A. LARSSON, P. WEIBRING, S. KARLSSON, S.M. GUBANSKI, S. KRÖLL and S. SVANBERG, "Fluorescence lidar imaging of fungal growth on high voltage outdoor composite insulators", Optics and Lasers in Engineering, Vol. 43, No. 6, pp. 624-632, 2005
- S. WALLSTRÖM, A.D. DERNFALK, M. BENGTSSON, S. KRÖLL, S.M. GUBANSKI and S. KARLSSON, "Image analysis and laser induced fluorescence combined to determine biological growth on silicone rubber insulators", Polymer Degradation and Stability, Vol. 88, No. 3, pp. 394-400.
- S.M. GUBANSKI, A. DERNFALK, J. ANDERSSON, H. HILLBORG, "Diagnostic Methods for outdoor polymeric insulators", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 14, No. 5, October 2007.
- I. GUTMAN, A. DERNFALK, J. LUNDQUIST, K. HALSAN, L. WALLIN, "Selection and dimensioning of high-voltage line composite insulators in Scandinavia", Proc. of the Int. Conf. "Composite insulators and HV insulation constructions", St. Petersburg, Russia, 16-19 June, 2008
- I. GUTMAN, A. DERNFALK, J. LUNDQUIST, T. OHNSTAD, L. WALLIN, "Field experience and test verification of HV composite apparatus insulators", Proc. of the Int. Conf. "Composite insulators and HV insulation constructions", St. Petersburg, Russia, 16-19 June, 2008
- S. BERLIJN, K. HALSAN, I. GUTMAN, A. DERNFALK: "Assessing ten years of service experience with composite line insulators at HVDC", World Congress & exhibition on insulators, arresters and bushings, Crete, 11-13 May, 2009
- A. DERNFALK, I. GUTMAN, L. CARLSHEM, R. KLEVEBORN: "Abnormal audible noise and visual discharge at glass cap and pin insulators related to the different properties of cement", 16th ISH-2009, Cape Town, South Africa, 24-28 August, 2009, B-12

- A. Dernfalk, I. Gutman, A. Nefedov, J. Seifert: "Pollution test methods for composite insulators: simulation of coastal environment and recovery of hydrophobicity", 16th ISH-2009, Cape Town, South Africa, 24-28 August, 2009, E-4
- I. Gutman, A. Dernfalk, K. Halsan, S. Berlijn, L. Carlshem, M. Uehara, J. Seifert: "Flashover performance of line composite insulators with different profiles intended for ice & snow ice environment", IWAIS-2009, Andermatt, Switzerland, 8-11 September, 2009, paper PO.002
- A. Dernfalk, I. Gutman, G. Olsson: "Detection of defects in porcelain insulators in service", Proc. of Int. Conf. on Conditions Monitoring and Diagnosis (CMD2010), Tokyo, Japan, September 6-11, 2010, C4-1, p.p. 529-532
- I. Gutman, A. Dernfalk: "Pollution tests for polymeric insulators made of hydrophobicity transfer materials", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 17, Issue 2, pp. 384-393, April 2010
- A. Dernfalk: "Meeting modern challenges in asset condition monitoring & diagnostics", INMR Vol. 19, No. 4, Q4, 2011, pp. 56-64
- H. Homma, K. Yaji, G. Sakata, T. Aso, A. Dernfalk, I. Gutman: "Development of flashover voltage test method for snow accreted insulators – Preliminary test with 33 kV class insulator samples", IWAIS-2011, Chongqing, China, May 8-13, 2011, paper C2_1_ID26
- H. Homma, K. Yaji, T. Aso, M. Watanabe, G. Sakata, A. Dernfalk, I. Gutman: "Evaluation of flashover voltage property of snow accreted insulators for 154 kV transmission line", IWAIS-2013, St. John's, Sept 8-11, 2013
- M. Radojicic, K. Halsan, I. Gutman, A. Dernfalk, L. Carlshem, L. Wallin: "Comparative testing of different anti-ice coatings for overhead line conductors with special focus on ice accretion, RIV and visual impact", IWAIS-2013, St. John's, Sept 8-11, 2013
- T. Langeland, M. Jafar, Y. Yang, L.M. Hytten, E. Hillberg, A. Dernfalk, "Technology Qualification of Offshore HVDC Transmission Systems", CIGRE Session 2014, B4-115
- H. Homma, K. Yaji, T. Aso, M. Watanabe, G. Sakata, A. Dernfalk, I. Gutman: "Evaluation on Flashover Voltage Property of Snow Accreted Insulators for Overhead Transmission Lines, Part III - 154 kV Full-scale Flashover Voltage Test of Snow Accreted Insulators -", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 21, No. 6, December 2014, p.p. 2568-2575
- A. Dernfalk, J. Lundengård, E. Petersson, I. Gutman, K. Tucker, S. Banerjee: "Advanced test methods for full-scale ice tests of DC insulators strings intended for ±350 kV", IWAIS-2015
- M. Radosavljevic, T. Lindquist, I. Gutman, A. Dernfalk: "Refurbishment of 400 kV AC substation in polluted environment: pros and cons for different modern insulation options including composite/RTV/hybrid", CIGRE SC A3 & B3 Joint Colloquium, Nagoya, Japan, 28 September – 2 October 2015, paper 236
- A. Dernfalk, J. Lundquist, I. Gutman: "Typical Approach & Practical Case Studies for AC/DC Conversion Projects", World Congress & Exhibition on Insulators, Arresters & Bushings, Munich, Germany, 18-21 October 2015
- K. Tucker, A. Dernfalk, I. Gutman: "Full-Scale Testing of HVDC Energized Insulators for High Salt/High Ice Environment", World Congress & Exhibition on Insulators, Arresters & Bushings, Munich, Germany, 18-21 October 2015

- M. Radosavljevic, T. Lindquist, I. Gutman, A. Dornfalk: "Design considerations for modern 400 kV AC substation in coastal area: what is missing in IEC/CIGRE requirements", CIGRE-IEC Colloquium on EHV and UHV (AC & DC), Montréal, QC, Canada, 2016, paper 54
- K. Yaji, H. Homma, K. Adachi, Y. Hori, T. Nishihara, A. Dornfalk, I. Gutman: "Evaluation on Flashover Performance of 154 kV Snow-accreted Composite Insulators Using Artificial Flashover Tests", 20th ISH-2017, Buenos Aires, Argentina, 2017, paper 164
- I. Gutman, A. Dornfalk, M. Yarmarkin: "Biological Growths on Composite Insulators", World Congress & Exhibition on Insulators, Arresters & Bushings, Barcelona-Sitges, Spain, 5-8 November 2017
- I. Gutman, A. Dornfalk: "Innovative testing techniques for verification of corona, pollution and ice/snow performance of insulation structures", World Congress & Exhibition on Insulators, Arresters & Bushings, Barcelona-Sitges, Spain, 5-8 November 2017
- M. Radosavljevic, A. Dornfalk, I. Gutman: "Development of requirements for testing and verification of RTV-coated substation support insulators for AC application", CIGRE Session 2018, A3-109
- A. Dornfalk, P. Sidenvall, I. Gutman: "Development of the test capable to reveal level of adhesion between fibreglass rod and housing of composite insulators", CIGRE-IEC 2019 Conference on EHV and UHV (AC & DC), April 23-26, 2019, Hakodate, Hokkaido, Japan, paper P1-10
- O. Lennerhag, A. Dornfalk, P. Nygren: "Supraharmonics in the presence of static frequency converters feeding a 16 2/3 Hz railway system", International Conference on Harmonics and Quality of Power (ICHQP), 2020
- I. Gutman, C. Ahlrot, P. Aparicio, A. Berlin, T. Condon, A. Dornfalk, J-F. Goddinet, K. Halsan, K. Kleinekorte, J. Lundengård, M. Radosavljevic, P. Sidenvall, S. Steevens, K. Varli, K- Välimaa: "Development of Innovative Test Procedure for Evaluation of Adhesion of Core-Housing of Composite Insulators: from Root Cause of Failures in Service to Reproducible Test Procedure", CIGRE Science and Engineering, No 20, February, 2021
- I. Gutman, P. Cardano, A. Dornfalk, J.M. George, T. Hayashi, K. Kondo, J. Lachman, S. Li, X. Liang, E. Moal, A. Pignini, J. Seifert, E. Solomonik, W. Vosloo, D. Windmar: "State-of-the-art of Pollution Test Procedures for Insulators with Hydrophobicity Transfer Materials", CIGRE Science and Engineering, No 21, June, 2021
- I. Gutman, A. Dornfalk, V. Malinen, M. Radosavljevic, K. Varli: "Critical Review on Biological Growth on Composite Insulators in Northern and Central European Environments: Evaluation of Risk for Pollution Flashover and Ageing", CIGRE Science and Engineering, No 22, October, 2021
- K. Varli, S. Steevens, J. Unterfinger, A. Dornfalk, I Gutman, J. Lundengård, P. Sidenvall: "Benchmarking of sealing systems of line composite insulators: ideas for innovative test methods", CIGRE Science and Engineering, No 25, June, 2022
- M. Jalonen, V. Malinen, I. Gutman, A. Dornfalk, M. Radosavljevic, K. Varli: "Impact of Biological Growths on Application of Composite Insulators: Experience Under European Conditions", INMR congress 2022
- I. Gurman, P. Cardano, A. Dornfalk, J-M. George, T. Hayashi, K. Kondo, J. Lachman, S. Li, X. Liang, E. Moal, A. Pignini, J. Seifert, E. Solomonik, W. Vosloo, D. Windmar: "Status of Pollution Test Procedures for Insulators Made from Hydrophobicity Transfer Materials", INMR World Congress 2022

A. DERNFALK, C. AHLHOLM, J. LUNDENGÅRD, I. GUTMAN, B. ADUM: "Countermeasures for high and extreme ice loads typical for Norwegian environment based on the concept of heating of shield wires and phase conductors", Proc. CIGRE Session 2022, B2-10515

I. GUTMAN, A. DERNFALK, J. LUNDENGÅRD, P. SIDENVALL, A. DECKWERTH, L. DIAZ, K. HALSAN, M. LEONHARDSBERGER, M. RADOSAVLJEVIC, P. TRENZ, K. VALRI, K. VÄLIMAA: "Countermeasures for high and extreme ice loads typical for Norwegian environment based on the concept of heating of shield wires and phase conductors", Proc. CIGRE Session 2022, D1-10828

V. DUBICKAS, E. THUNBERG, J. HANSSON, A. DERNFALK, P. SIDENVALL: "Lightning strike to ground – a case study about observed cable damages, risk estimation and protection method", Proc. CIGRE Session 2022, B1-10511

I. GUTMAN, A. DERNFALK, A. DECKWERTH, L. DIAZ, M. JALONEN, M. LEONADSBERGER, P. TRENZ: "Evaluation of Recovery of Hydrophobicity of Composite Insulators: Test Methods Available" INMR World Congress 2023

I. GUTMAN, A. DERNFALK, A. DECKWERTH, L. DIAZ, M. JALONEN, M. LEONHARDSBERGER, P. TRENZ: "Test method for evaluation of ability for recovery of hydrophobicity of composite insulators", INMR World Congress 2023

O. LENNERHAG, A. DERNFALK, S. PERETTI: "Advancing power quality measurements in the Swedish transmission grid", submitted for publication at CIGRE Session 2024, C4-10595