

# LIST OF THE RESEARCH PROJECTS

## I. National research projects

1. New concepts related to the fuse operating using specific methods of virtual instrumentation (Noi concepte privind funcționarea siguranțelor fuzibile folosind metode specifice instrumentației virtuale), grant no.706/19.01.2009, PNII IDEI, 2009-2011, National Agency for Science, Technology and Innovation

**Position:** Grant Director

**Theoretical results:** new concepts to improve the operating of the high breaking capacity fuses

**Practical results:** new type of fuses with controlled fusing and improved cooling

2. Intelligent system for monitoring and diagnose of the electrical equipment (Sistem inteligent de monitorizare și diagnosticare a echipamentelor electrice), grant no.21014, PNCDI 2, 2007-2009, National Agency for Science, Technology and Innovation

**Position:** Member of the research team

**Theoretical results:** new solutions/algorithms of monitoring and diagnostic of the electrical equipment

**Practical results:** a test bench based on microcontroller for monitoring and diagnostic of the electrical equipment

3. New intelligent device to improve the energy quality using specific methods of virtual instrumentation (Nou dispozitiv inteligent pentru îmbunătățirea calității energiei utilizând mijloace specifice instrumentației virtuale), CEEX National Programme: Funding Application for Excellences Research Projects. Code project: 5, Contract no: 1489, 2006-2008

**Position:** Grant Director

**Theoretical results:** designing of the new intelligent device to improve the energy quality

**Practical results:** prototype of modular voltage adjusting level

4. Study of the stabilization and conditioning of the wines using the cold plasma (Studiul stabilizării și condiționării vinurilor prin tratament cu plasmă rece), grant no.117, CEEX, 2006-2008, National Agency for Science, Technology and Innovation

**Position:** Member of the research team

**Theoretical results:** new solutions related to the possibilities to treat the wines through the cold plasma

**Practical results:** test bench to treat different type of wines using the cold plasma

5. Advanced design and testing methods of the insulation systems to operate in extreme conditions and with fault tolerances (Metode avansate de proiectare și testare a sistemelor de izolație destinate funcționării în condiții extreme și toleranțe la defectare), grant no.164, type A, CNCSIS, code 489, 2004 – 2006, National Agency for Science, Technology and Innovation

**Position:** Member of the research team

**Theoretical results:** new design and testing methods for the insulation systems

**Practical results:** test bench and experimental tests for different type of insulators at extreme conditions of temperature, humidity and mechanical stresses

6. Controlled system using artificial intelligence for monitoring the electromagnetic pollution emissions and diagnostic of electrical and electroenergetics apparatus, equipments and installations (Sistem controlat prin inteligența artificială de monitorizare a emisiilor electromagnetice poluante și de diagnosticare a aparatelor, echipamentelor și instalațiilor electrice și electroenergetice), grant type A, no. 27637/2005-2006, National Council of Scientific Research from University Education (CNCSIS).

**Position:** Member of the research team

**Theoretical results:** new solutions based on artificial intelligence for monitoring the electromagnetic pollution emissions because of different type of power electrical equipment

**Practical results:** laboratory tests of monitoring the electromagnetic pollution emissions and diagnostic of power electrical equipment

7. Modern solutions for monitoring and diagnose of electrical apparatus from different industrial installations (Soluții moderne privind monitorizarea și diagnosticarea aparatului din instalațiile electrice), grant type A, no.129/294/2002-2003, National Council of Scientific Research from University Education (CNCSIS).

**Position:** Member of the research team

**Theoretical results:** new solutions of monitoring and diagnostic of the apparatus from electrical networks using specific methods of virtual instrumentation

**Practical results:** a test bench with a data acquisition board for monitoring and diagnostic of the apparatus from electrical networks

8. Expert systems of total quality assurance in the industry of electrical materials and equipment (Sisteme expert de asigurare a calității totale în industria de materiale și echipamente electrotehnice), grant type D, no.42445/215, 2000-2001, World Development Bank and National Agency for Science, Technology and Innovation

**Position:** Member of the research team

**Theoretical results:** new solutions to provide the total quality of the electrical materials and equipment

**Practical results:** new laboratory to check/test the quality of the electrical materials and different type of electrical equipment

9. Modelling of magnetic material characteristics by using specific algorithms of neural networks (Modelarea caracteristicilor materialelor magnetice utilizand algoritmi specifici inteligenței artificiale), grant type T, no.6167/2000, National Agency for Science, Technology and Innovation.

**Position:** Member of the research team

**Theoretical results:** new models for magnetic material characteristics

**Practical results:** software programme about modelling of magnetic material characteristics

10. Reactors with cold plasma for air and water depollution (Reactoare cu plasma rece pentru depoluarea aerului și a apei), grant no.6177/1999-2000, Romanian Research and Technology Department.

**Position:** Member of the research team

**Theoretical results:** the using of electrical discharge for air and water depollution

**Practical results:** a cold plasma reactor for air and water depollution

11. Overcurrent protection devices for power semiconductors (Dispozitive de protecție la supracurenți pentru instalațiile cu semiconductoare de putere), contract no.442/1996-1999, National Agency for Science, Technology and Innovation.

**Position:** Member coordinator

**Theoretical results:** new solutions as regard the overcurrent protection of installations with power semiconductors

**Practical results:** overcurrent protection devices for installations with power semiconductors

## II. International research projects

1. Modelling and simulation of the current limiting fuses, Capacities, Module III, Bilateral Research Project China - Romania, Contract no. 610/01.01.2013, 2013-2014

**Position:** Grant Director

**Theoretical results:** Mathematical models of the temperature of the current limiting fuses; Mathematical models of the time-current characteristics

**Practical results:** 3D thermal simulations; laboratory testing of the current limiting fuses

2. Modelling of metal vapor arc for high current interruption in vacuum, Capacities, Module III, Bilateral Research Project China - Romania, Contract no. 515/14.04.2011, 2011-2012

**Position:** Grant Director

**Theoretical results:** Mathematical models of the metal vapor density for high current interruption in vacuum; Mathematical models of the vacuum electric arc discharge

**Practical results:** 3D thermal simulations; laboratory testing of the vacuum circuit breakers

3. New Voltage Regulator for Power Transformers to Improve the Energy Quality, European Reintegration Grant (ERG), Contract no. MERG-7-CT-2005-014990, European Commission

**Position:** Main researcher

**Theoretical results:** Designing of a new device to regulate the voltage level between admissible limits (electromagnetic device design for step and continuous voltage adjustment; development of the programme for control unit; 3D thermal simulations)

**Practical results:** prototype for the new device; laboratory testing and validation of the proposed solution; dissemination of the new concept

4. Electro-thermal simulations of components and assemblies, Contract code PP03032501SF, DCSI – U.S.

**Position:** Member of the research team

**Theoretical results:** New solutions about electro-thermal modelling and simulation of the power semiconductors

**Practical results:** Modelling and simulation of different types of the power semiconductors, devices and power assemblies

5. Climatic tests on UPS, Contract code PP03101301SF, Azienda chimica genovese, Italy.

**Position:** Member coordinator

**Theoretical results:** Thermal aspects about uninterruptible power supply (UPS)

**Practical results:** Thermal checking of different type of uninterruptible power supply (UPS)

6. Burn-in and heat tests, Contract code PP04030302SF, Azienda chimica genovese, Italy.

**Position:** Member coordinator

**Theoretical results:** Thermal aspects about installations with power semiconductors

**Practical results:** Thermal checking of different installations with power semiconductors

7. Solution for MM160, Contract code PP03121001SF, Miller – U.S.

**Position:** Member of the research team

**Theoretical results:** Study about the replacement of a power semiconductor modul from a welding installation

**Practical results:** The achievement of a new power semiconductor modul for the welding installation type MM160

8. Thermal simulation and optimisation of PCB, Contract code PP04032401SF, Gate, Italy.

**Position:** Member coordinator

**Theoretical results:** New solutions about the optimisation of power circuit boards (PCB)

**Practical results:** The achievement of an optimum structure for the power circuit boards (PCB) from thermal point of view

9. Line filters for electric cabinets, Contract code PP04030401SF, Miller – U.S.

**Position:** Member of the research team

**Theoretical results:** Study about the overvoltage protection of power converters

**Practical results:** The achievement of some line filters for overvoltage protection of power converters

10. Alternative MOS for IRFZ46N, Contract code PP03052901SF, Miller – U.S.

**Position:** Member of the research team

**Theoretical results:** A comparative study about power semiconductors type MOS

**Practical results:** Experimental tests as regard the characteristics of the power semiconductors type MOS

11. On-line checking of the thermal contact between MOS and heatsink, Contract code PP03060401SF, BTM, Italy.

**Position:** Member of the research team

**Theoretical results:** New solutions to check the thermal contact between power semiconductors type MOS and heatsink

**Practical results:** The achievement of a test bench for on-line checking of the thermal contact between power semiconductors type MOS and heatsink

12. Accelerated reliability tests on electrolytic capacitors, Contract code PP03060901SF, Gate, Italy.

**Position:** Member coordinator

**Theoretical results:** Study as regard the reliability of the electrolytic capacitors

**Practical results:** Accelerated reliability tests for electrolytic capacitors

13. Thermal project of a heat spreader for TO220, Contract code PP04032201SF, BTM, Italy.

**Position:** Member coordinator

**Theoretical results:** New solutions about heat spreader for power semiconductors type TO220

**Practical results:** The achievement of thermal models for heat spreaders to be used for power semiconductors type TO220

14. Updated software for CEV test with PWM control, Contract code PP04102502SF, BTM, Italy.

**Position:** Member coordinator

**Theoretical results:** The improving of the software to check the thermal contact for the CEV devices with PWM control

**Practical results:** The achievement of an updated software to check the thermal contact for the CEV devices with PWM control

15. Optimisation of a heat spreader for TO220 – 2, Contract code PP04111701SF, BTM, Italy.

**Position:** Member coordinator

**Theoretical results:** New solutions about improving the heat spreader for power semiconductors type TO220

**Practical results:** The achievement of an optimum model for heat spreaders to be used for power semiconductors type TO220

16. Contact check for SCANIA, Contract code PP04121402SF, BTM, Italy.

**Position:** Member of the research team

**Theoretical results:** Solutions about checking the thermal contact at power semiconductor devices which equipped the SCANIA trucks

**Practical results:** The achievement of a test bench to check the thermal contact at power semiconductor devices which equipped the SCANIA trucks

17. Characterization of MOS STP140NF55 and STP60NS04Z, Contract code PP05012502SF, BTM, Italy.

**Position:** Member of the research team

**Theoretical results:** Theoretical aspects about the characteristics of the MOS power semiconductors type STP140NF55 and STP60NS04Z

**Practical results:** Experimental tests about the characteristics of the MOS power semiconductors type STP140NF55 and STP60NS04Z

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