

Proposals for cooperation

Department of Electroinsulation and Cable Techniques of National Technical University «Kharkov Polytechnic Institute»



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Publications: The scientific results of the department used in the preparation of Ph.D. theses and student research papers.

Below are some of the works on the themes of research conducted by our department.

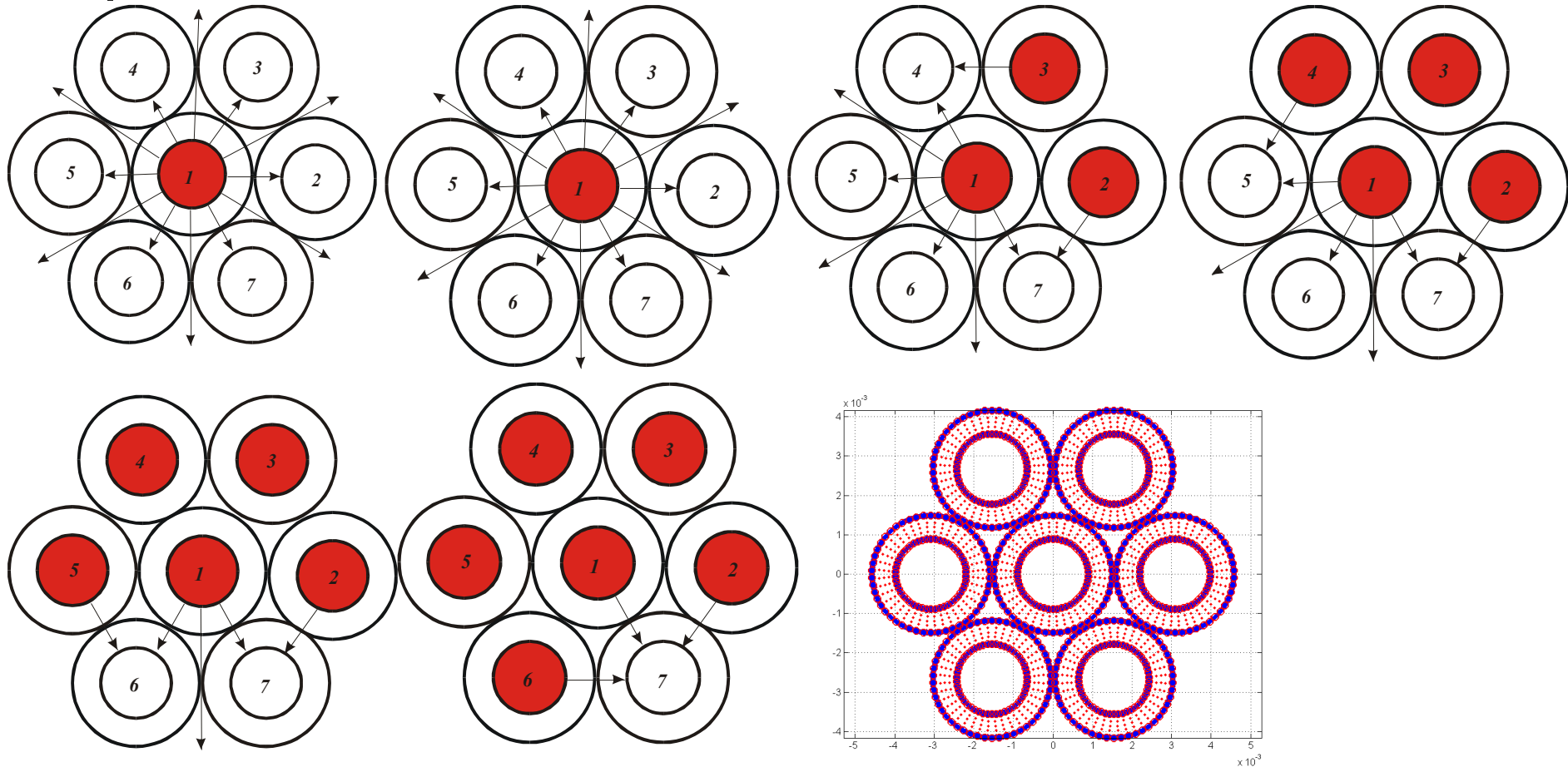
A more complete list of the works can be found in Google Scholar.



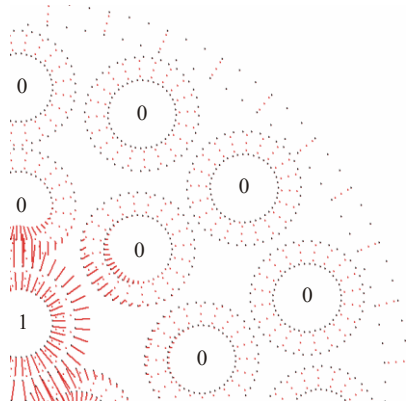
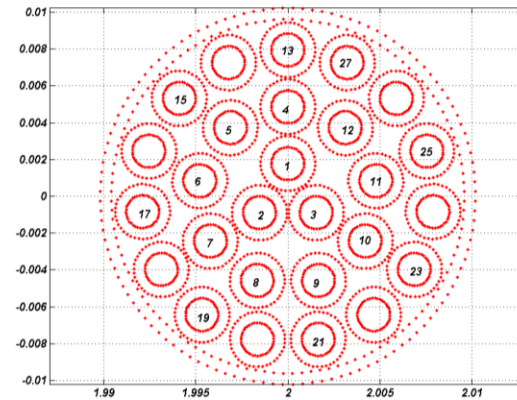
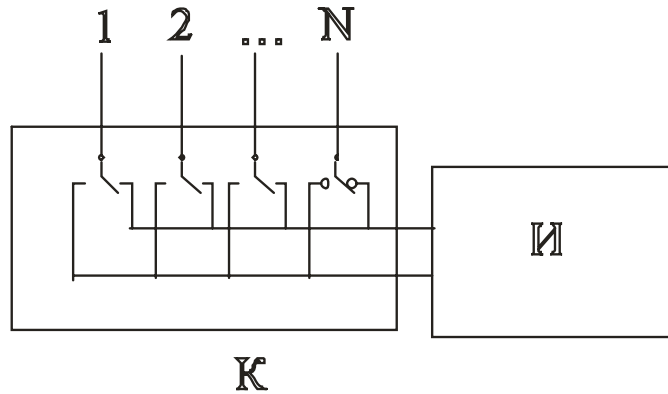
- **The most significant results of the department in the scientific activities:**

- 1. Numerical calculation of electric field multicore cables to substantiate monitoring schemes.**
- 2. Monitoring of aging and determining the resource life of the polymer insulation of power, control and optical cables Nuclear Power Plant.**
- 3. Development and Introduction of integrated optical fibers with high-voltage power cable systems for electricity.**

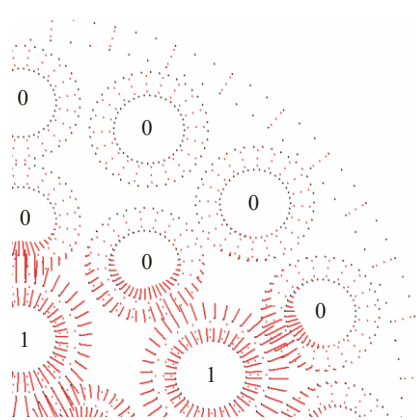
1.1.Examples of the Numerical calculation of electric field multicore cables



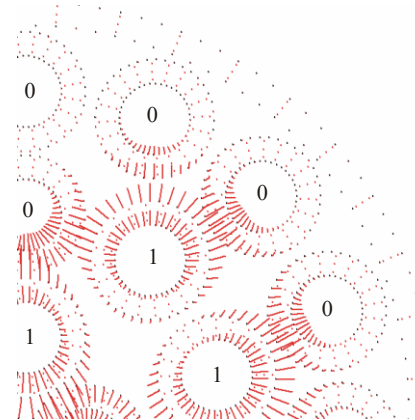
1.2. Distributions of the electric field lines in the multi-core cable with an increase in the number of potential conductor from one (a) up to four (d)



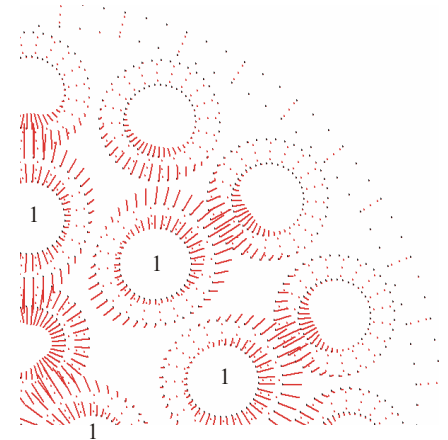
a



b

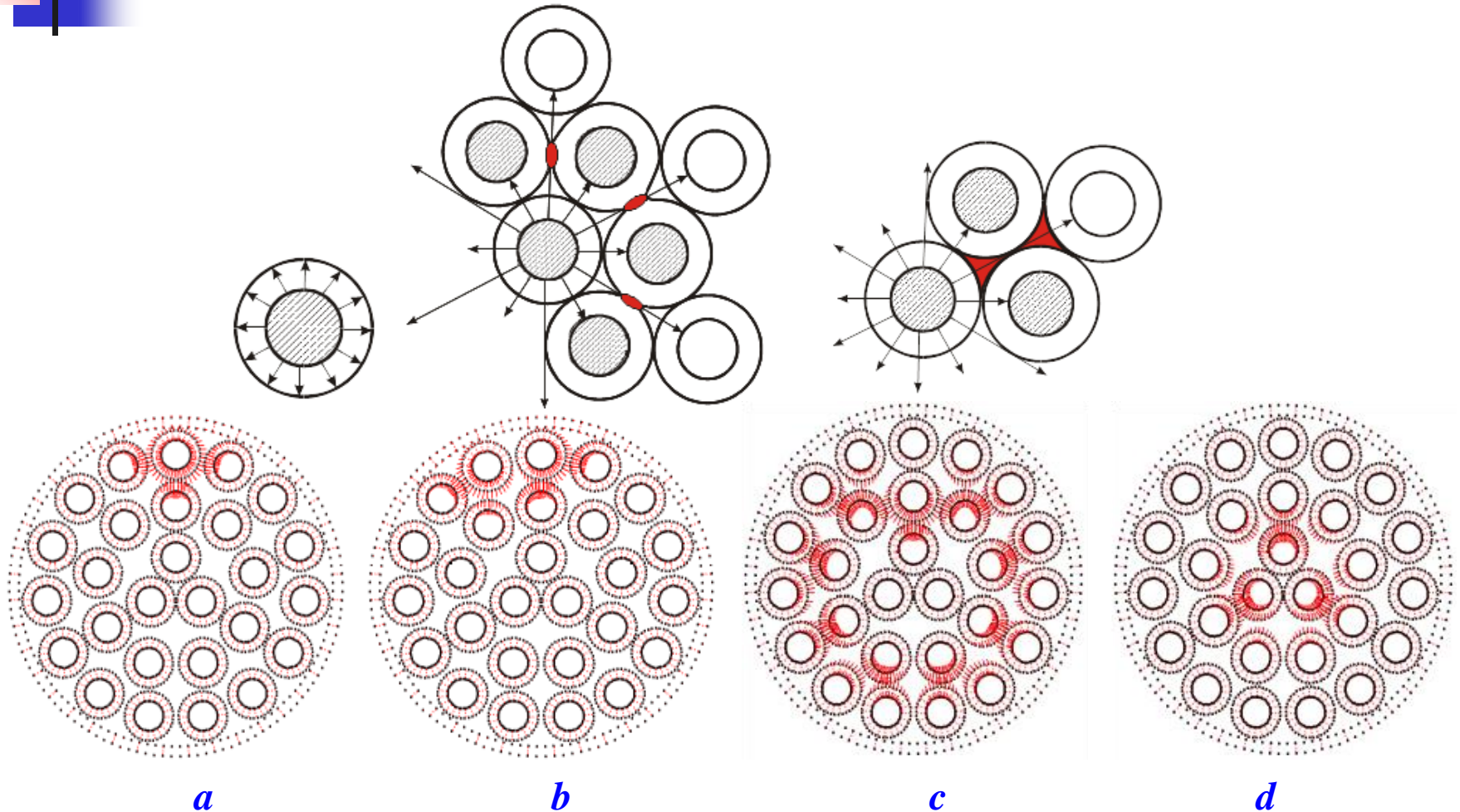


c

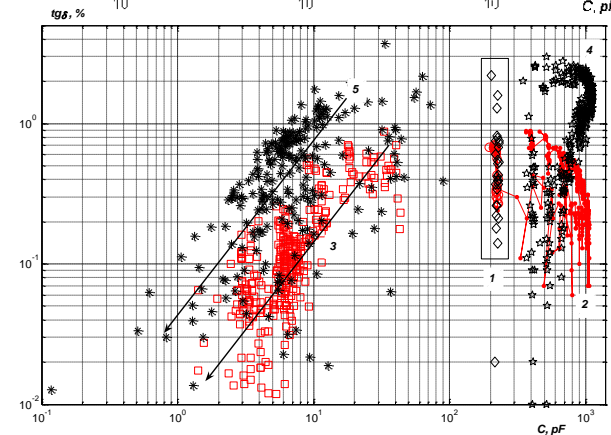
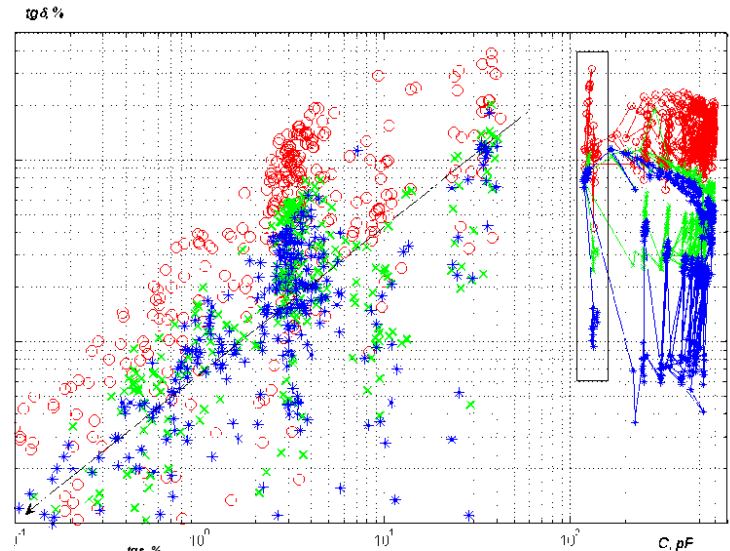
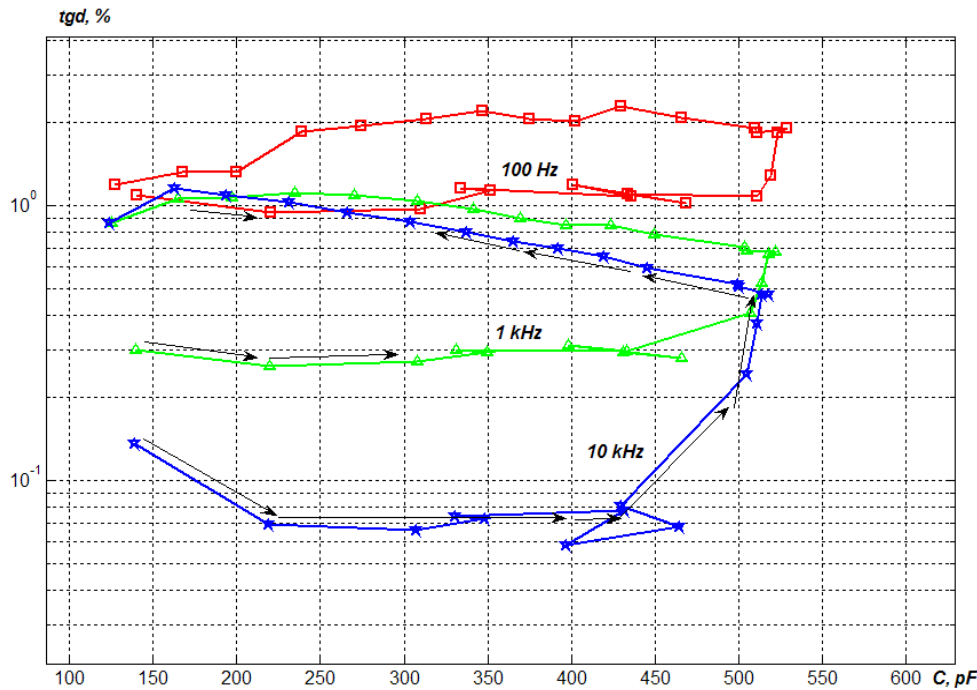


d

1.3. Distributions of electric field lines at inspection 27-core control cable in normal (a) and tangential (b, c, d), the fall of the electric field at the interface

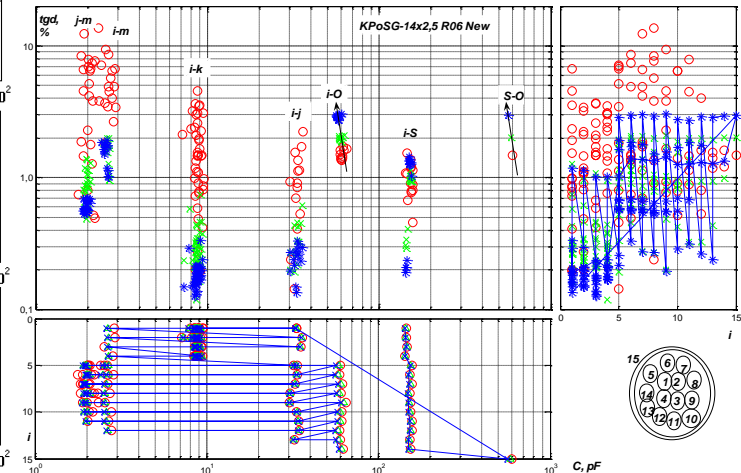
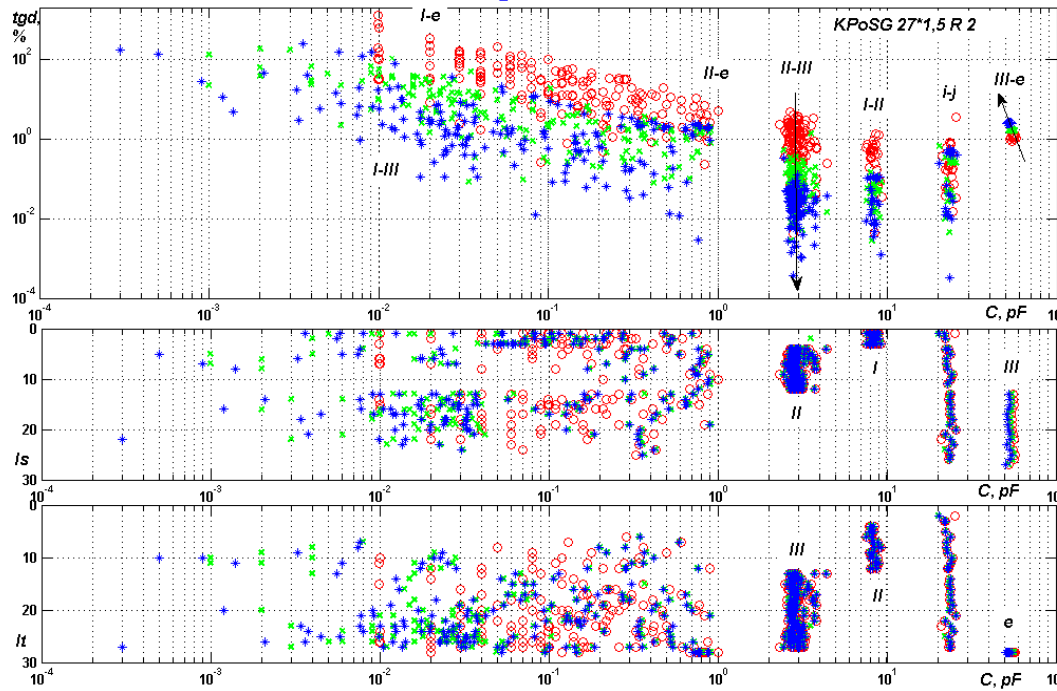


1.4. Results of complex schemes multi-core cables surveys based on the calculation of the electric field to identify polymeric insulation aging process



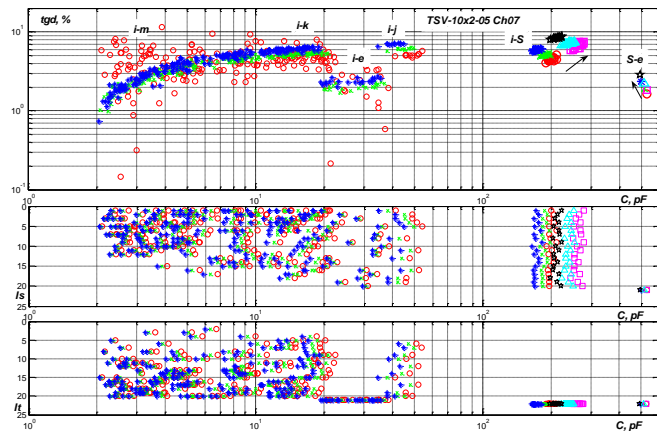
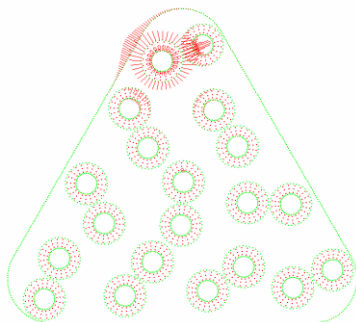
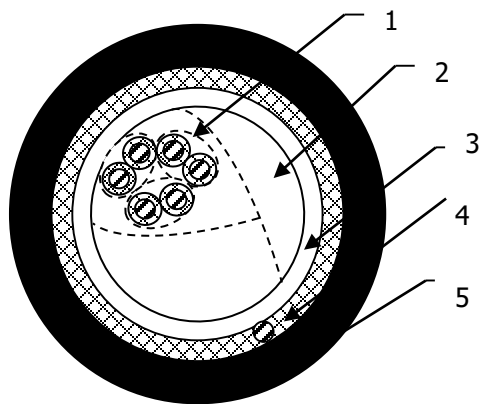
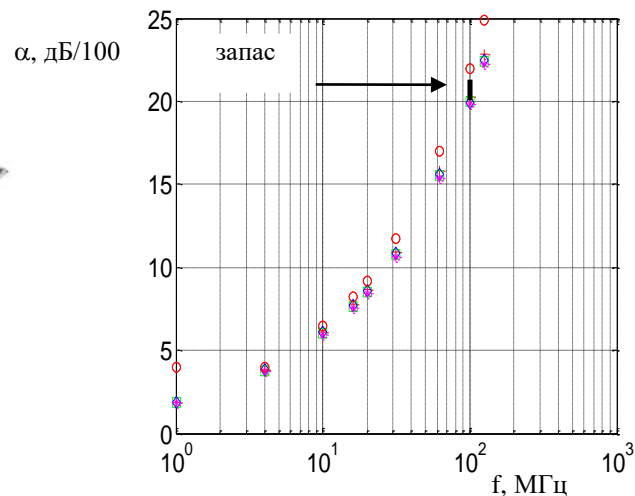
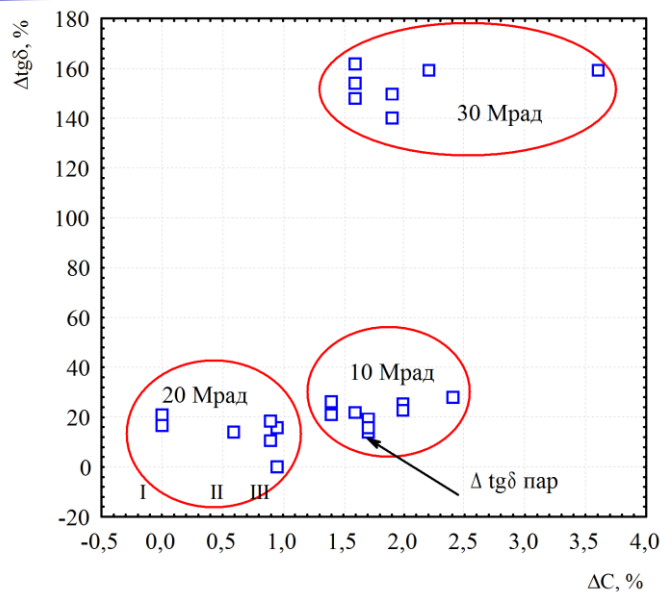
2. Monitoring of aging and determining the resource life of the polymer insulation of power, control and optical fiber cables Nuclear Power Plant

2.1. The Diagnostics based on the results of measurements of electrical capacitance and dielectric loss tangent

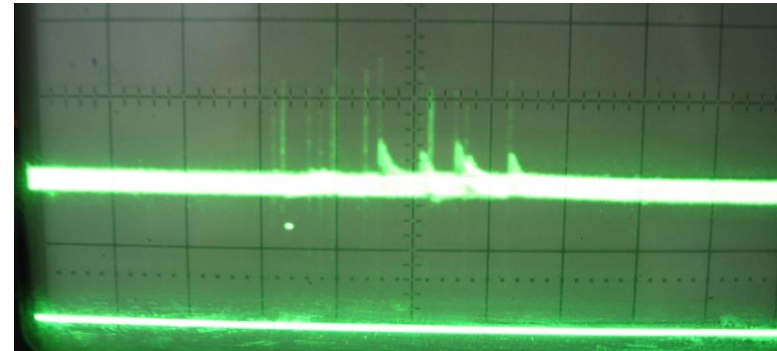


C- tgδ diagrams of control cables NPP

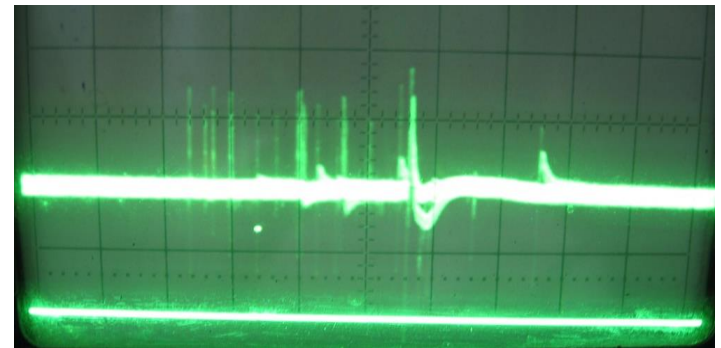
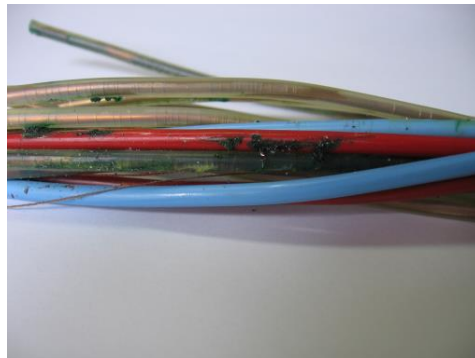
C- $tg\delta$ diagrams radiation aging cables of structured cabling systems based on twisted pair



2.2. Diagnostics of aging cables based on the characteristics of partial discharge

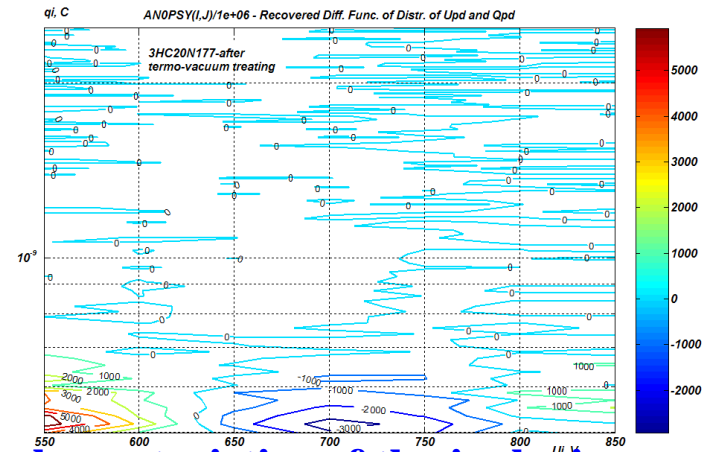
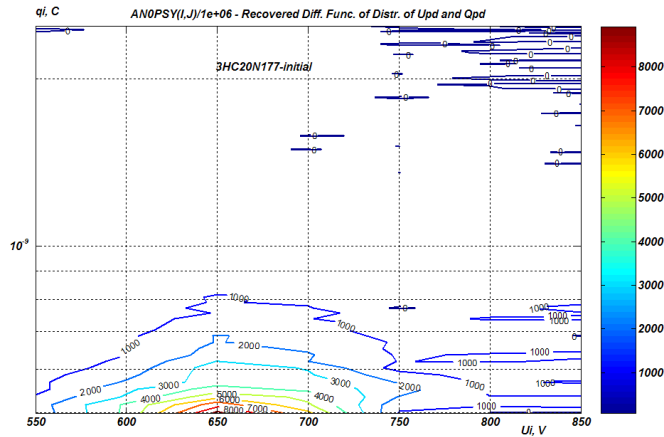


unaged cable $U_{ivpd} = 2,8 \text{ kV}$

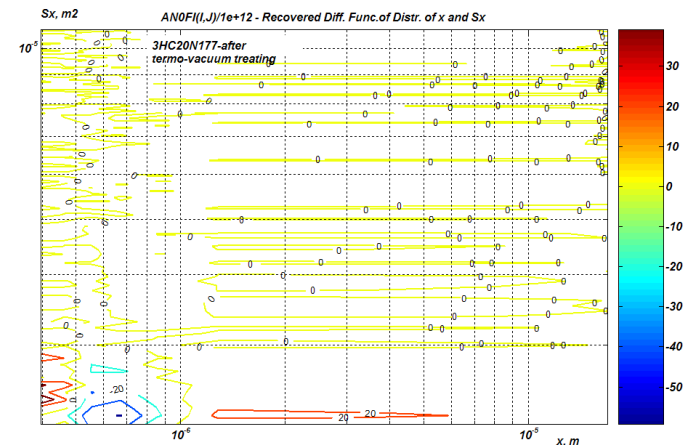
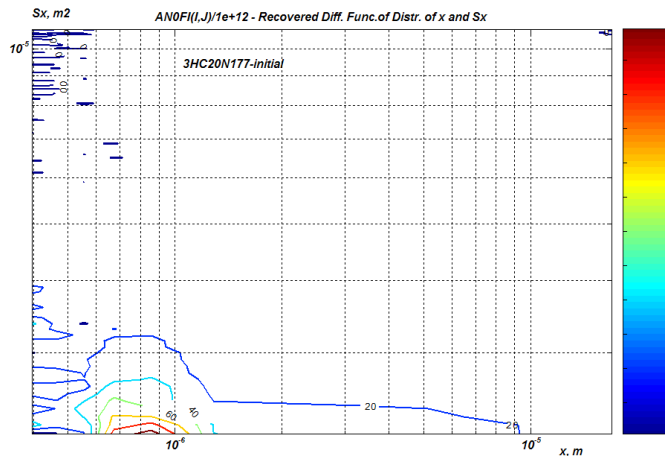


aged cable $U_{ivpd} = 2 \text{ kV}$

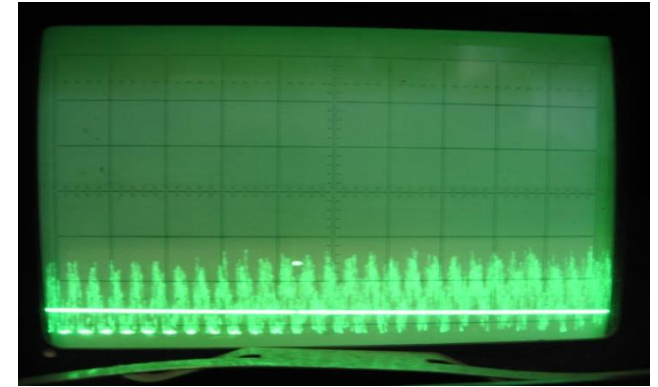
Determination of inclusions distribution function of geometrical parameters - thickness and the discharge area



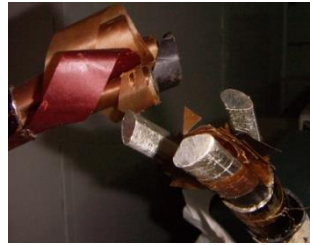
Level lines of distribution function electrical characteristics of the inclusions



Tests hermetic nuclear penetrations

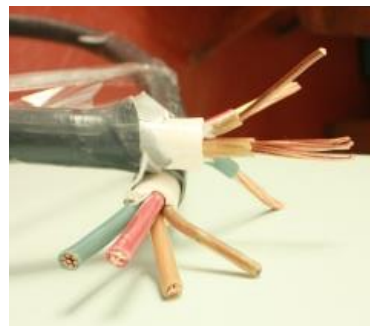
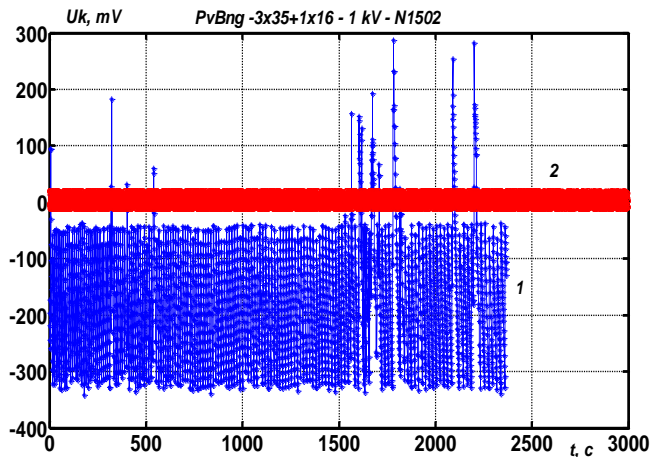
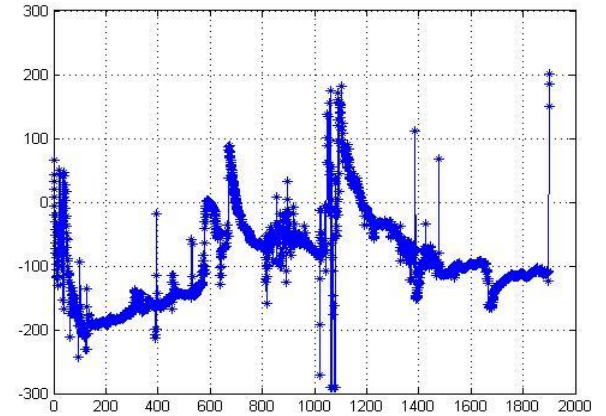


2.3. Monitoring of the aging of the polymer cable insulation based on the contact potential difference

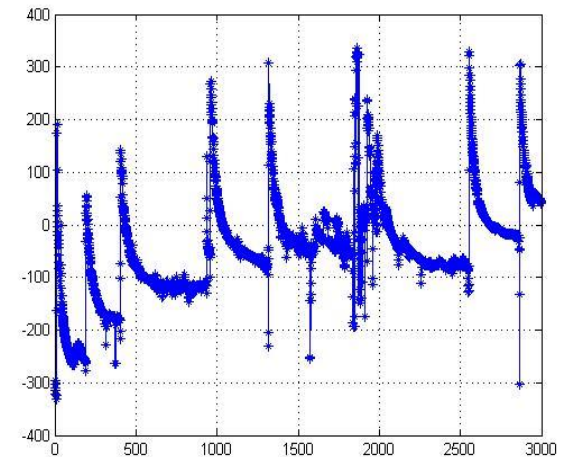


U_{kp}
mV

$$U_{FZ_o} = \frac{(\phi_2 - \Delta_2) - (\phi_1 + \Delta_1)}{e}$$



U_{kp}
mV



- 1 - unageing cable
- 2 - ageing cable

t , c

2.4. Diagnostic radiation ageing of optical fiber cables

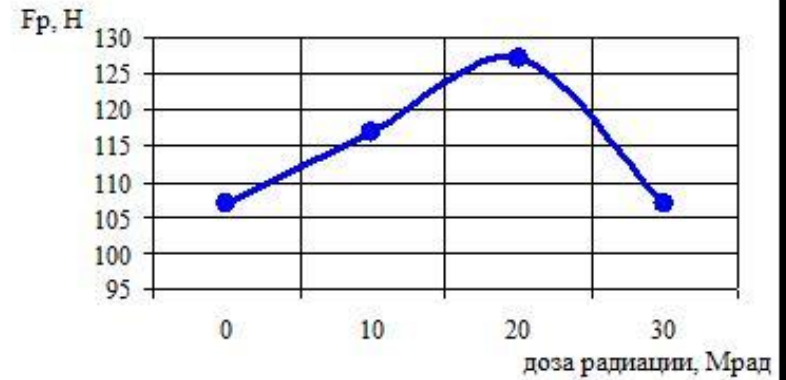
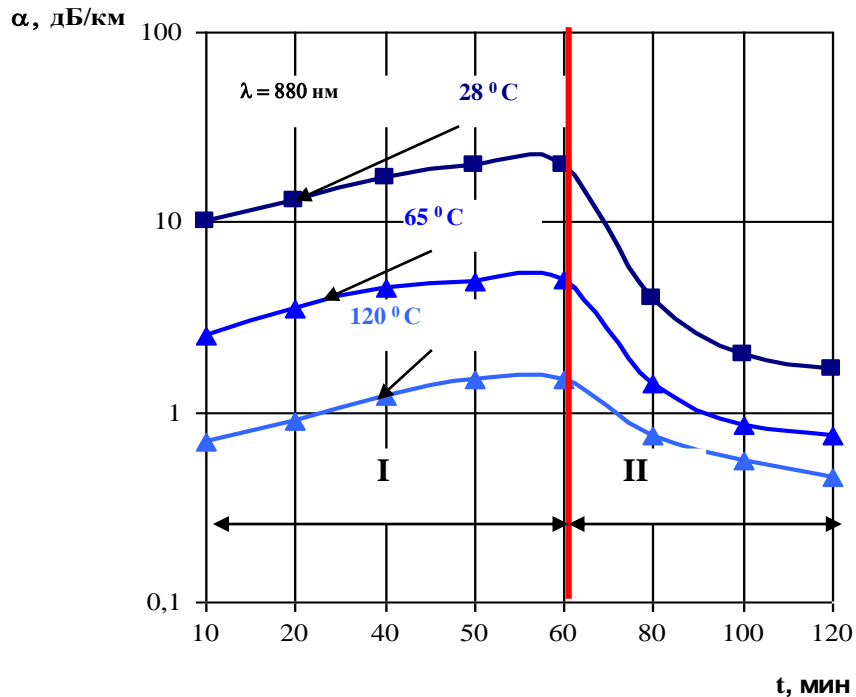
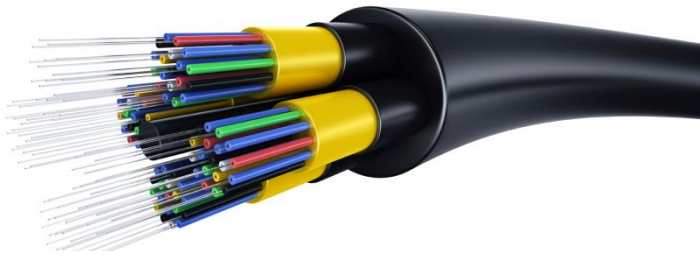


Рис.3 Изменение разрывной прочности ПБТ под действием радиации

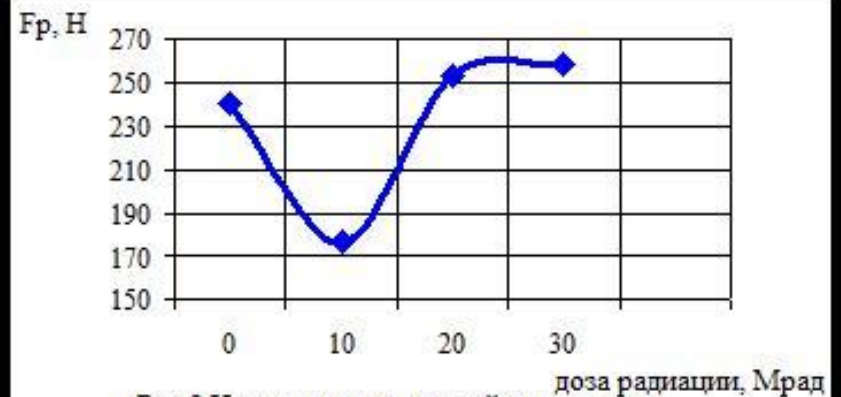
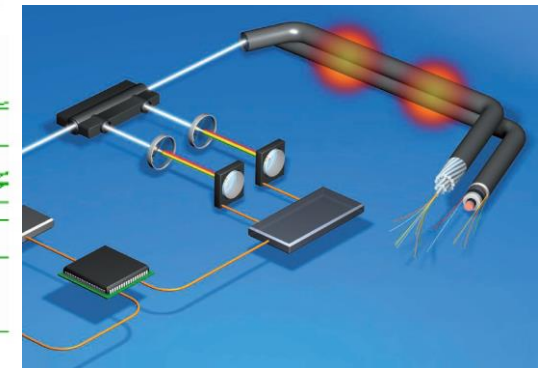
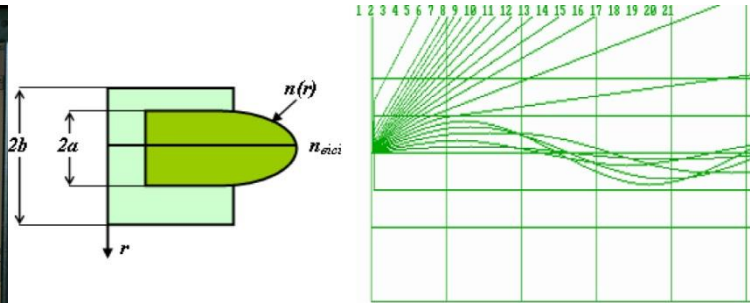
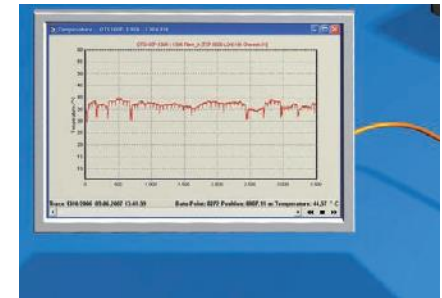
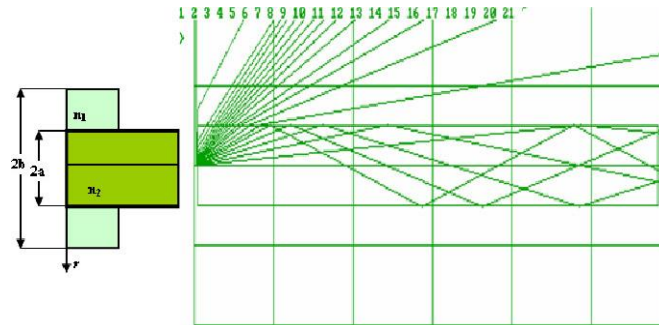
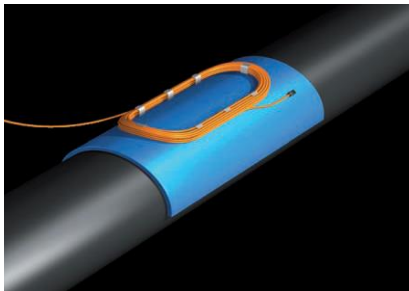


Рис.2 Изменение разрывной прочности арамидных нитей под действием радиации

3. Development and Introduction of integrated optical fibers with high-voltage power cable systems





We look forward to mutual cooperation!