

განაცხადი საქართველოს 2005 წლის სახელმწიფო ბიუჯეტის პროექტისათვის
(უმაღლესი სასწავლებლების სამეცნიერო-კვლევითი სამუშაოები)

უმაღლესი სასწავლებელი ევ. ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტი

ფაკულტეტი ან სამეცნიერო-კვლევითი დაწესებულება ფიზიკის ფაკულტეტი, ზოგადი ფიზიკის კათედრასთან
არსებული გამოყენებითი ელექტროდინამიკის ლაბორატორია

მომუშავეთა საშტატო რიცხოვნობა: 22.25

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მათ შორის: მთავარი მეცნიერ თანამშრომელი – ლაბორატორის გამგე 1

უფროსი მეცნიერ თანამშრომელი 1

წამყვანი მეცნიერ თანამშრომელი -----

მეცნიერ თანამშრომელი 6

უმცროსი მეცნიერ თანამშრომელი 5

ტექნიკური პერსონალი 8

მომსახურე პერსონალი (ბუღალტერი, მოლარე, დამლაგებელი, დარაჯი და სხვ.) -----

სამეცნიერო - კვლევითი სამუშაოების ძირითადი მიმართულებები:

ა. მობილური ტელეფონის უსაფრთხო, ახალი ტიპის ანტენების შექმნა და მათი გამოსხივების შესწავლა
მომხმარებლის გათვალისწინებით

ბ. დამხმარე გამომსხივებლების მეთოდის განვითარება

გ. ფოტონური მოვლენები პერიოდულ სტრუქტურებში

დ. ელექტრომაგნიტური ველების გამოკვლევა ნაწილობრივ და სრულად შემოსაზღვრულ არეებში

(**შენიშვნა:** ლაბორატორიის თანამშრომლების დიდი ნაწილი ერთდროულად არის ჩართული პირველ ოთხ ძირითად მიმართულებაში (**ა, ბ, გ, დ**), რის გამოც აქვთ გამოქვეყნებული ბევრი საერთო შრომა. პუბლიკაციების ჩამონათვალში განმეორების თავიდან აცილების მიზნით ეს შრომები სრულად ჩამოთვლილია პროფ. რევაზ ზარიდის შრომების სიაში (ბოლო 10 წელიწადში რეფერირებად სამეცნიერო ჟურნალებში, ბოლოდით გამოყოფილება მოწვეული ლექციების მასალები, მოპოვებული პატენტის და სხვა განსაკუთრებული პუბლიკაციები განვითარებული დამხმარე გამომსხივებლების მეთოდთან დაკავშირებით).

ამავე მოსაზრებით გრანტების ნუსხაც მოცემულია მხოლოდ პროფ. რევაზ ზარიდის გრაფაში მაშინ როდესაც აღნიშნულ გრანტებში მონაწილეობას იღებდა რამის კვლევა თანამშრომელი).

სამეცნიერო-კვლევით სამუშაოებში აგრეთვე აქტიურად არიან ჩართულნი სტუდენტები.

ქვემოთ ჩამოთვლილი გამოქვეყნებულ შრომების საფუძველზე უკანასკნელი 10 წლის განმავლობაში ლაბორატორიაში დაცული აქვთ **9 საკანდიდატო დისერტაცია** შემდეგ მაძიებლებსა და ასპირანტებს:

- ფრიდონ შუბითიძე** “არასტაციონარული ელექტროდინამიკური პროცესები დიფრაქციის, ალგზნებისა და განუხტვის ამოცანებში” 1997 წელი
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- ალექსანდრე ბიჯამოვი** “დამხმარე გამომსხივებლების მეთოდის გაფართოება ფოტონურ კრისტალებზე დაფუძნებულ მოწყობილობათა მოდელირებისთვის ბიანიზოტროპული მასალების გამოყენებით” 2004 წელი

1. ინფორმაცია სამეცნიერო-კვლევითი სამუშაოების შესახებ (ივსება თითოეული მიმართულებისათვის ცალ-ცალკე):

1.1 სამეცნიერო-კვლევითი სამუშაოს მიმართულება: **მობილური ტელეფონის უსაფრთხო ახალი ანტენების შექმნა და მათი გამოსხივების შესწავლა მომხმარებლის გათვალისწინებით**

1.1

სამეცნიერო კვლევის მიმართულება	მობილური ტელეფონის უსაფრთხო ახალი ანტენების შექმნა და მათი გამოსხივების შესწავლა მომხმარებლის გათვალისწინებით
კვლევის არსი, მიზანი და ამოცანები	კვლევის არსი, მიზანი და ამოცანა მდგომარეობს მობილური ანტენის რეალური მოდელის გამოკვლევა, შემუშავებასა და შექმნაში, შემდგომ ჯანმრთელობის მაქსიმალური უსაფრთხოების უზრუნველყოფის თვალსაზრისით მისი მომხმარებელთან ურთიერთქმედების შესასწავლად ევექტური რიცხვითი მეთოდის გამოყენებით.
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დაკავებულ თანამშრომელთა რიცხოვნობა	6
ხელმძღვანელი: რევაზ ზარიძე საკონტაქტო ტელეფონები: 290821; 290845	ფიზ.-მათ. მეცნიერებათა დოქტორი, პროფესორი. გამოყენებითი ელექტროდინამიკის ლაბორატორიის გამგე. http://lae.icts.tsu.edu.ge 1. R. Zaridze, R.Jobava, D.Karkashadze, D.Pommerenke, "Irradiation of Volumid Body", Electrostatic Discharge Problems Symposium Phoenix, Arizona, Sep. 1995. 2. D. Karkashadze and R. Zaridze. "The Method of Auxiliary Sources in Applied Electrodynamics". Latsis Symposium on Computational Electromagnetics, Zurich, Sept. 1995, Invited Lecture. 3. Zaridze R.S., Karkashadze D.D., Jobava R.G., Pommerenke D., Aidam M. "Calculation and Measurement of Transient Fields of Voluminous Objects." Electrical Overstress/Electrostatic Discharge Symposium Proceedings. Phoenix, Arizona, USA. Sept. 12-14 1995, pp. 95-101. IEEE Catalog No. 95TH8088. ISBN: 1-878303-59-7/0-7803-2710-1 (Microfiche Edition). 4. R.G. Jobava, R.S. Zaridze, D.D. Karkashadze, Ph.I. Shubitidze, "The method of retarded potentials in the three dimensional pulse scattering problem on perfectly conducted bodies", Bulletin of the Georgian Academy of Science, v.152, N.2, 1995, pp. 284-291. 5. Djobava R.G., Zaridze R.S., Karkashadze D.D., Shubitidze P.I. The Retarded Potentials Technique for Pulses Scattering on the Perfectly Conducting Three-dimensional Bodies. Proceedings of the Seminar/Workshop "Numerical Solution of Direct and Inverse Problems of the Electromagnetic and Acoustic Waves Theory (DIPED-95)" Supported by IEEE. L'viv, Ukraine, Sept. 19-21 1995, pp. 41-42. 6. R.G. Jobava, Ph.I. Shubitidze, R. Zaridze, D.D. Karkashadze, "Investigation of the Transient Electromagnetic Field Radiated of Scattered by three-dimensional Conducting Bodies", MMET'96 VI-th International Conference Proceedings in Mathematical Method in Electro-magnetic Theory, September 10-13, 1996, Lviv, Ukraine pp.323-327. IEEE Catalog No. 96TH8183. ISBN: 966-02-0026-9/0-7803-3291-1 (Microfiche Edition). 7. R. Zaridze, D. Karkashadze, R. Djobava, D. Pommerenke, M. Aidam, "Numerical Calculation and Measurement of Transient Fields from Electrostatic Discharges", IEEE Transactions on Components, Packaging and Manufacturing Technology, Part C. Manufacturing, July 1996, Volume 19, Number 3, 178-183 pp. 8. Bogdanov F.G., Zaridze R.S., Karkashadze D.D., Shubitidze Ph.I. Modified Auxiliary Sources Method for Investigation of Diffraction on the Volominous Bodies of Complicated Form. "MMET'96 VI-th International Conference in Mathematical Method in Electromagnetic Theory". Proceedings. September 10-13, 1996, Lviv, Ukraine pp. 65-69. IEEE Catalog No. 96TH8183, ISBN: 966-02-0026-9/0-7803-3291-1 (Microfiche Edition). 9. R. Jobava, D. Karkashadze, R. Zaridze, Ph. Shubitidze, D. Pommerenke, M.Aidam. Numerical Calculation of ESD. "Electrical Overstress Electrostatic Discharge Symposium Proceedings". September 9-12, 1996, Orlando, Florida, USA. P.P 203-211. IEEE Catalog No. 96TH8150, ISBN: 1-878303-69-4/0-7803-3101-6 (Microfiche Edition). 10. Karkashadze D.D., Zaridze R.S., Jobava R.G, Bogdanov F.G., Shubitidze Ph.I., "The Method of Auxiliary Sources in

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მატერიალურ-ტექნიკური ბაზის განახლებისათვის საჭირო ღონისძიებები	2 კომპიუტერი Pentium IV-ის შეძენა

1.2 სამეცნიერო - კვლევითი სამუშაოს მიმართულება: დამხმარე გამოძისხივებლების მეთოდის შემდგომი განვითარება

სამეცნიერო კვლევის მიმართულება	<u>დამხმარე გამოძისხივებლების მეთოდის შემდგომი განვითარება</u>
კვლევის არსი, მიზანი და ამოცანები	კვლევის არსი, მიზანი და ამოცანა არის დამხმარე გამოძისხივებლების მეთოდის (დ.გ.მ.) შემდგომი განვითარება და მისი გამოყენება ელ. დინამიკის ამოცანების ამოსახსნელად. დ.გ. მეთოდზე დამყარებული გამოთვლითი თვალსაზრისით ეფექტური ალგორითმების შემუშავება. ალგორითმების ბაზაზე პროგრამული პაკეტების შექმნა და შემდგომ მათი გამოყენებით პრაქტიკული მნიშვნელობის მქონე ელექტროდინამიკური აქტუალური ამოცანების გადაჭრა. შემუშავებული დამხმარე გამოძისხივებლების მეთოდის გაფართოება ბიზოტროპული, კირალური და კომპლექსური მასალებისთვის.
კვლევის მეთოდოლოგია	დამხმარე გამოძისხივებლების მეთოდი
სამუშაოს შესრულების ვადები	2005-2010 წწ.
სამუშაოს შესრულების გეგმა ეტაპობრივად	2005-2006: დ.გ.მ. განვითარება; 2006-2007: განვითარებული დ.გ. მეთოდზე დაყრდნობით ეფექტური ალგორითმების შემუშავება; 2007-2008: ალგორითმების ბაზაზე პროგრამული პაკეტის შექმნა; 2008-2009: შექმნილი პროგრამული პაკეტის მეშვეობით პრაქტიკული მნიშვნელობის მქონე ელექტროდინამიკური აქტუალური ამოცანების გადაჭრა; 2009-2010: შემუშავებული დამხმარე გამოძისხივებლების მეთოდის გაფართოება ბიზოტროპული, კირალური და კომპლექსური მასალებისთვის.
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დაკავებულ თანამშრომელთა რიცხოვნობა	5
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შემსრულებლები:	
1. ზურაბ წვერიკმაზაშვილი 2. გიორგი ლომიძე 3. ვლადიმერ ლაბაძე 4. ნანა ქიზიყურაშვილი 5. ირინა პაროშინა 6. ალექსანდრე რაზმაძე	1. ფიზ.-მატ. მეცნ. კანდიდატი; წამყვანი ინჟინერი 2. ფიზ.-მატ. მეცნ. კანდიდატი; წამყვანი ინჟინერი 3. უფ. ლაბორანტი 4. ლაბორანტი 5. სტუდენტი 6. სტუდენტი
არსებული მატერიალურ-ტექნიკური ბაზა	3 კომპიუტერი Pentium III, 1 კომპიუტერი Pentium IV
მატერიალურ-ტექნიკური ბაზის განახლებისათვის საჭირო ღირებულებები	2 კომპიუტერი Pentium IV-ის შეძენა

1.3 სამეცნიერო-კვლევითი სამუშაოს მიმართულება: ფოტონური მოვლენები პერიოდულ სტრუქტურებში

სამეცნიერო კვლევის მიმართულება	ფოტონური მოვლენები პერიოდულ სტრუქტურებში
კვლევის არსი, მიზანი და ამოცანები	კვლევის არსი, მიზანი და ამოცანა არის ფოტონური მოვლენების შესწავლა პერიოდულ სტრუქტურებში, მარტივი ფოტონური ელექტრონული მოწყობილობების (ფილტრის, სიმძლავრის გამყოფის, შემრევის, ცირკულატორის და ა.შ.) შექმნა და მათ ბაზაზე ტერაპერტულ და ოპტიკურ დიაპაზონის მიზნობრივი ინტეგრალური სტრუქტურების შემუშავება. დამხმარე გამომსხვივებლების მეთოდზე დაყრდნობით კომპიუტერული პროგრამული პაკეტის შექმნა, ფოტონების გავრცელებისთვის აკრძალული დიაპაზონის (ფ.გ.ა.დ.) პერიოდული სტრუქტურების და ფუნქციონალური კვანძების გამოსაკვლევა.
კვლევის მეთოდოლოგია	დამხმარე გამომსხვივებლების მეთოდი; სასრული სხვაობების მეთოდი დროით არეში (FDTD)
სამუშაოს შესრულების ვადები	2005-2010
სამუშაოს შესრულების გეგმა	2005-2006: ფოტონური მოვლენების შესწავლა;

ეტაპობრივად	2006-2008: მარტივი ფოტონური ელექტრონული მოწყობილობების შექმნა და მათ ბაზაზე ტერაპერტულ და ოპტიკურ დიაპაზონის მიზნობრივი ინტეგრალური სქემების შემუშავება; 2008-2010: პროგრამული პაკეტის შექმნა.
მოსალოდნელი შედეგები ეტაპობრივად	1. მარტივი ფოტონური ელექტრონული მოწყობილობების შექმნა; 2. ტერაპერტულ და ოპტიკურ დიაპაზონის მიზნობრივი ინტეგრალური სქემების შემუშავება; 3. კომპიუტერული პროგრამული პაკეტის შექმნა.
დაკავებულ თანამშრომელთა რიცხოვნობა	4
ხელმძღვ-ლი: დავით ქარქაშაძე საკონტაქტო ტელეფონები: 290821; 290845	ფიზ.-მათ. მეცნ. კანდიდატი, დოცენტი 1. Karkashadze D.D. , Metshvarishvili D.A., Shubitidze P.I. Applied Program Product Based on the Auxiliary Sources Method. Proceedings of the Seminar/ Workshop "Numerical Solution of Direct and Inverse Problems of the Electromagnetic and Acoustic Waves Theory (DIPED-95)" Supported by IEEE. Lviv, Ukraine, Sept. 19-21, 1995. pp. 43-44. 2. R. Zaridze, R.Jobava, D.Karkashadze , D.Pommerenke, "Irradiation of Volumid Body", Electrostatic Discharge Problems Symposium Phoenix, Arizona, Sep. 1995. 3. D. Karkashadze and R. Zaridze, "The Method of Auxiliary Sources in Applied Electrodynamics", Latsis Symposium on Computational Electromagnetics, Zurich, Sept. 1995. 4. Zaridze R.S., Karkashadze D.D. , Jobava R.G., Pommerenke D., Aidam M. "Calculation and Measurement of Transient Fields of Voluminous Objects." Electrical Overstress/Electrostatic Discharge Symposium Proceedings. 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<ol style="list-style-type: none"> 1. ლაზარე ბერძენიშვილი 2. ქეთევან გამყრელიძე 3. ალექსანდრე ბიჯამოვი 4. დიმიტრი ნიკოლაევი 5. ელენა უჩავა 6. ვასილ ტაბატაძე 	<ol style="list-style-type: none"> 1. ფიზ.-მათ. მეცნ. კანდიდატი; უფ. მეცნ. თანამშრომელი; 2. ფიზ.-მათ. მეცნ. კანდიდატი; უმც. მეცნ. თანამშრომელი 3. ფიზ.-მათ. მეცნ. კანდიდატი; ლაბორანტი; 4. სტუდენტი 5. სტუდენტი 6. სტუდენტი <p>ლაზარე ბერძენიშვილი</p> <ol style="list-style-type: none"> 1. "Influence of Temperature Generation Property of the Waveguide Neodymium Laser", Bulletin of the Academy of Sciences of the Georgian, Vol. 160 #1, 1999. 2. "Quasicontinuous Laser Plasma in the Process of Interaction of Train of Giant Pulses with Solid Target", Bulletin of the Academy of Sciences of the Georgian, Vol. 160 #1, pp. 66-68, 1999. 3. "Quasi-cw Laser-Produced Plasma Generated by a Train of Giant Pulses on the Surface of a Solid Target", Laser Physics, Vol. 10, No. 3, pp. 727-729, 2000. <p>ალექსანდრე ბიჯამოვი</p> <ol style="list-style-type: none"> 1. R. Zaridze, G. Bit-Babik, K. Tavzarashvili, A. Bijamov. The Method of Auxiliary Sources Applied to the Analysis of Adaptive Transverse Resonant Antennas. IEEE Antennas and Propagation Society International Symposium 1999, July 11-16, 1999, Orlando, Florida. Vol. 4, pp. 2524-2527. 2. K. Tavzarashvili, R. Zaridze, G. Bit-Babik, A. Bijamov. "Singularities of Scattered Field." Proceedings of IV International Seminar Workshop, Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory, DIPED-99, October 21-23, 1999, Lviv, Ukraine. IEEE Catalogue Number 99TH8402, ISBN 966-02-0864-2, 0-7803-5409-5, pp.105-108. 3. G. Bit-Babik, Ph. Shubitidze, R. Zaridze, D. Karkashadze, K. Tavzarashvili, A. Bijamov. "Generalized Method of Auxiliary Sources (Integrated Auxiliary Sources)." Proceedings of IV International Seminar Workshop, Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory, DIPED-99, October 21-23, 1999, Lviv, Ukraine. IEEE Catalogue Number 99TH8402, ISBN 966-02-0864-2, 0-7803-5409-5, pp. 97-100. 4. G. Saparishvili, R. Zaridze, G. Bit-Babik, K. Tavzarashvili, A. Bijamov. The Experimental Setup for Image Reconstruction Using the Acoustic and EM Fields Visualization Techniques Based on the MAS. Second International Symposium of Trans Black Sea Region on Applied Electrodynamics, 27-29 June, 2000, Xanthi, Greece. http://mykonos.esd.ece.ntua.gr/~jae/BSUAE.html

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არსებული მატერიალურ-ტექნიკური ბაზა	3 კომპიუტერი Pentium III, 1 კომპიუტერი Pentium IV
მატერიალურ-ტექნიკური ბაზის განახლებისათვის საჭირო ღონისძიებები	2 კომპიუტერი Pentium IV-ის შექმნა

1.4 სამეცნიერო-კვლევითი სამუშაოს მიმართულება: ელექტრომაგნიტური ველების გამოკვლევა ნაწილობრივ და სრულად შემოსაზღვრულ არეებში

სამეცნიერო კვლევის მიმართულება	ელექტრომაგნიტური ველების გამოკვლევა ნაწილობრივ და სრულად შემოსაზღვრულ არეებში
კვლევის არსი, მიზანი და ამოცანები	კვლევის არსი, მიზანი და ამოცანა არის კომპიუტერული მოდელირებით მძლავრი ელექტრომაგნიტური ველების ზემოქმედების და მის შედეგად გამოწვეული თერმული მოვლენების დონისა და განაწილების

	გამოკვლევა და შესწავლა ბიოლოგიურ ობიექტებზე (ადამიანზე) და აუცილებელი სტანდარტების შემუშავება, რომლებიც განსაზღვრავენ უსაფრთხო გარემოცვას. სასწავლო და კვლევითი მიზნებისთვის პროგრამული პაკეტის შემუშავება, რომელიც გაუადვილებს მაღალი კურსის სტუდენტებს და ასპირანტებს გამოკვლევებს, დაეხმარება მათ გაიუმჯობესონ გამოთვლითი და ინჟინრული ინტუიცია ელექტრომაგნიტიზმის სფეროში.
კვლევის მეთოდოლოგია	დამხმარე გამომსხვიებლების მეთოდი; სასრული სხვაობების მეთოდი დროით არეში (FDTD)
სამუშაოს შესრულების ვადები	2005-2010
სამუშაოს შესრულების გეგმა ეტაპობრივად	2005-2007: კომპიუტერული მოდელირებით მძლავრი ელექტრომაგნიტური ველების ზემოქმედების და მის შედეგად გამოწვეული თერმული მოვლენების დონისა და განაწილების გამოკვლევა და შესწავლა ბიოლოგიურ ობიექტებზე (ადამიანზე); 2007-2009: სტანდარტების შემუშავება; 2008-2010: პროგრამული პაკეტის შემუშავება.
მოსალოდნელი შედეგები ეტაპობრივად	1. სტანდარტების შემუშავება; 2. პროგრამული პაკეტის შექმნა.
დაკავებულ თანამშრომელთა რიცხოვნობა	4
ხელმძღვანელი: დავით კაკულია საკონტაქტო ტელეფონები: 290821; 290845	ფიზ.-მათ. მეცნ. კანდიდატი; უმც. მეცნიერ თანამშრომელი 1. R. Zaridze, G. Bit-Babik, K. Tavzarashvili, A. Bijamov, D. Kakulia , G.Ghvedashvili "The Method of Auxiliary Sources in Scattering and Diffraction Problems" 2001 IEEE Antenna & Propagation Society International Symposium, July 8-13, 2001, Boston, Massachusetts, USA. IEEE Catalogue Number: 01CH37229, ISBN 0-7803-7070-8, pp. 738-741. http://www.ieeeaps.org/2001APSURSI 2. G. Ghvedashvili, R. Zaridze, K.Tavzarashvili, A. Bijamov, I.Chelidze, D.Kakulia . "Numerical Simulation of Metallic Antenna Covered with Dielectric Layer", Bulletin of the Georgian Academy of Science, 163, #2, 2001, pp. 253-255. 3. R. Zaridze, D. Kakulia , K.Tavzarashvili, A. Bijamov, G. 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შემსრულებლები:	
<p>1. გიორგი ჭელიძე</p> <p>2. რუსუდან ციტიაშვილი</p> <p>3. არჩილ ჭრელაშვილი</p> <p>4. გიორგი ქაჯაია</p> <p>5. ელენა ნიკოლაევა</p>	<p>1. ფიზ.-მათ. მეცნ. კანდიდატი; უმც. მეცნიერ თანამშრომელი</p> <p>2. ფიზ.-მათ. მეცნ. კანდიდატი; უფ. მეცნიერ თანამშრომელი</p> <p>3. ფიზ.-მათ. მეცნ. კანდიდატი; უფ. მეცნიერ თანამშრომელი</p> <p>4. სტუდენტი</p> <p>5. სტუდენტი</p> <p>გიორგი ჭელიძე</p> <p>1. G.Chelidze. A counter-example in a theorem of the intersection of embedded closed sets, Bull. Acad. Sci. Georgia, 156, N2, 1997, pp. 207-209.</p> <p>2. G.Chelidze. Intersection of a sequence of embedded closed sets in a Banach space, Mathematical Notes, N63, N2, 1998, pp. 272-275.</p> <p>3. G.Chelidze. On the critical values of parameters characterizing the intersection of embedded sets, Mathematical Notes, N68, N2, (2000), pp. 303-310.</p> <p>4. R. Zaridze, D. Kakulia, K.Tavzarashvili, A. Bijamov, G. Ghvedashvili, G.Chelidze, "Electrodynamic Properties of Semi-open Objects with Cavities and Partitions", Proceedings of Vth International Seminar/Workshop on Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory (DIPED-2001), Lviv, Ukraine, September 18-20, 2001, pp. 54-59. http://www.ewh.ieee.org/soc/cpmt/ukraine/</p> <p>5. R. Zaridze, D. Kakulia, K.Tavzarashvili, A. Bijamov, G. Ghvedashvili, G.Chelidze, "Determination of Eigenvalues of The Object Using The Method Of Auxiliary Sources (MAS)". Proceedings of VIth International Seminar/Workshop on Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory (DIPED-2001), Lviv, Ukraine, September 18-20, 2001, pp. 183-190. http://www.ewh.ieee.org/soc/cpmt/ukraine/</p> <p>6. R. Zaridze, D. Kakulia, K. Tavzarashvili, A. Bijamov, G. Ghvedashvili, G. Chelidze. "Method of Auxiliary Sources Implementation for Diffraction Problem Solution on Semi-Open Metallic Surface with Partitions and Enclosed Dielectric Objects". 2002 IEEE Antennas and Propagation Society International Symposium, San Antonio, Texas, June 16-21, 2002, vol. 1, pp. 172-175. http://www.ieeeaps.org/2002APSURSI</p> <p>7. R. Zaridze, D. Kakulia, G. Chelidze, G. Ghvedashvili. "Investigation of The Resonance Characteristics of The Car Case". Proceedings of VIth International Seminar/Workshop on Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory (DIPED-2002), Tbilisi, Georgia, October 10-13, 2002, pp. 102-105. http://www.ewh.ieee.org/soc/cpmt/ukraine/</p> <p>8. R. Zaridze, D. Kakulia, K. Tavzarashvili, G.Z. Chelidze, D. Pommerenke, K. Xiao. "Electromagnetic Analysis of the Large Semi Open Structures using Method of Auxiliary Sources". 2003 IEEE International Antennas and Propagation Symposium and USNC/CNC/URSI North American Radio Science Meeting, June 22-27, 2003, Columbus, OH, USA. IEEE Catalog #03CH37450C http://aps2003.eng.ohio-state.edu/</p>
არსებული მატერიალურ-ტექნიკური ბაზა	3 კომპიუტერი Pentium III, 1 კომპიუტერი Pentium IV
მატერიალურ-ტექნიკური ბაზის განახლებისათვის საჭირო ღონისძიებები	2 კომპიუტერი Pentium IV-ის შეძენა