

Publications
of the works of Prof. Vesselin Petkov

Monographs

- [I] Scattering Theory for Hyperbolic Operators. North-Holland, Amsterdam, 1989.
- [II] Geometry of Reflecting Rays and Inverse Spectral Problems. John & Wiley and Sons, Chichester, 1992 (with L. Stoyanov).

Articles

- [1] The Cauchy problem for symmetrizable systems and for nonstrictly hyperbolic equations. *Uspehi Mat. Nauk.* **26** (1971), No 6, 251–252 (in Russian).
- [2] Necessary conditions for the Cauchy problem for hyperbolic systems with multiple characteristics to be well-posed. *Uspehi Mat. Nauk.* **27** (1972), No 4, 221–222 (in Russian).
- [3] Necessary conditions for the correctness of the Cauchy problem for non-strictly hyperbolic equations. *Dokl. Acad. Nauk SSSR.* **206** (1972), 287–290 (in Russian); English translation: *Soviet Math. Dokl.* **13** (1972), 1213–1217.
- [4] On the Cauchy problem for first-order hyperbolic systems with multiple characteristics. *Dokl. Acad. Nauk SSSR.* **209** (1973), 795–797 (in Russian); English translation: *Soviet Math. Dokl.* **14** (1973), 534–537.
- [5] The Cauchy problem for nonsymmetrizable hyperbolic systems. *Mathematics and Education in Mathematics* **2** (1974), 167–173 (in Bulgarian).
- [6] Necessary conditions for the Cauchy problem for nonstrictly hyperbolic equations to be well posed. *Uspehi Mat. Nauk.* **29** (1974), No 5, 3–70 (in Russian); English translation: *Russian Math. Surveys.* **29** (1974), 1–70 (with V. Ia. Ivrii).
- [7] Necessary conditions for the Cauchy problem for nonsymmetrizable systems to be well posed. *Trans. Seminar Petrovski.* **1** (1975), 211–236 (in Russian); English translation: *Amer. Math. Soc. Transl.* **119** (1982), 25–50.

- [8] Cauchy problem for a class of nonstrictly hyperbolic equations with double characteristics. *Serdika Matematicheskoe Spisanie* **1** (1975), 372–380 (in Russian).
- [9] Economic difference scheme for Neumann boundary problem for a hyperbolic equation of second order. *Mathematics and Education in Mathematics* **3** (1976), 209–215 (with R. D. Lazarov, in Bulgarian).
- [10] On effectively hyperbolic systems of first order. *Ann. Sofia University, Mathematics and Mechanics* **67** (1976), 375–389 (with N. D. Kutev, in Russian).
- [11] Parametrix of the Cauchy problem for nonsymmetrizable hyperbolic systems with characteristics of constant multiplicity. *Trans. Moscow Math. Soc.* **1** (1978), 3–47 (in Russian); English translation: *Trans. Moscow Math. Soc.* **1** (1980), 1–47.
- [12] Le problème de Cauchy et la propagation de singularités pour une classe des systèmes hyperboliques non symétrisables. Séminaire Goulaouic-Lions-Schwartz, Exposé No. V, Ecole Polytechnique, 1974–1975.
- [13] Equations et systèmes hyperboliques à caractéristiques multiples. Université Paris VI, URA 189 CNRS, 1985.
- [14] Propagation des singularités pour des systèmes hyperboliques non symétrisables. *Serdika Matematicheskoe Spisanie* **2** (1976), 283–294 (with G. Popov).
- [15] Paramétrix du problème de Cauchy pour des systèmes hyperboliques à caractéristiques de multiplicité constante. *C. R. Acad. Bulg. Sci.* **29** (1976), 1095–1097.
- [16] Propagation de singularités pour des systèmes hyperboliques à caractéristiques de multiplicité variable. *C. R. Acad. Bulg. Sci.* **30** (1977), 183–185.
- [17] Propagation de singularités pour une classe des systèmes hyperboliques non symétrisables. *C. R. Acad. Bulg. Sci.* **30** (1977), 487–489.
- [18] Propagation de singularités pour des systèmes hyperboliques à caractéristiques de multiplicité constante. *Serdika Matematicheskoe Spisanie* **3** (1977), 153–158.

- [19] Propagation de singularités pour une classe des systèmes hyperboliques à caractéristiques de multiplicité variable. *Serdika Matematicheskoe Spisanie* **3** (1977), 187–197.
- [20] Sur la condition de Levi pour des systèmes hyperboliques à caractéristiques de multiplicité variable. *Serdika Matematicheskoe Spisanie* **3** (1977), 309–317.
- [21] Propagation of singularities for pseudo-differential operators. Zentral Institut für Mathematik und Mechanik, Berlin, 1977.
- [22] Application of Fourier integral operators concerning hyperbolic operators with multiple characteristics. In: Contribution to the School on Global Analysis, (Ed. B.-W.Schulze) Berlin, 1977, 33–46.
- [23] Microlocal forms for hyperbolic systems. *Math. Nachr.* **93** (1979), 117–131.
- [24] Asymptotics of the scattering amplitude for non-convex bodies. *C. R. Acad. Bulg. Sci.* **32** (1979), 573–576.
- [25] Propagation de singularités pour le problème de transmission et application au problème inverse de diffusion. *C. R. Acad. Sci. Paris, Série A* **290** (1980), 753–755.
- [26] High frequency asymptotics of the scattering amplitude for non-convex bodies. *Comm. Partial Differential Equations* **5** (1980), 293–329.
- [27] Représentation de l'opérateur de diffusion pour des systèmes hyperboliques dissipatifs. *C. R. Acad. Sci. Paris, Série A* **291** (1980), 95–98.
- [28] Comportement asymptotique de la phase de diffusion pour des domaines non-convexes. Séminaire Goulaouic-Schwartz, Exposé No. XIII, Ecole Polytechnique, 1980-1981.
- [29] Asymptotique de la phase de diffusion pour des domaines non-convexes. *C. R. Acad. Sci. Paris, Série A* **292** (1981), 275–277 (with G. Popov).
- [30] Construction de paramétrix pour le problème de Cauchy pour des systèmes hyperboliques (cas symplectique). Séminaire Equations aux Dérivées Partielles Hyperboliques et Holomorphes, Université Paris VI, Paris, 1980–1981.

- [31] Representation of the scattering operator for dissipative hyperbolic systems. *Comm. Partial Differential Equations* **6** (1981), 993–1022.
- [32] Formule de Weyl pour le laplacien dans des domaines non-bornés. In: Non-linear partial differential equations and their applications, Seminar Collège de France, vol. **III**, Pitman Research Notes in Mathematics Series **70**, Boston, 1982, 291–300.
- [33] Propagation de singularités sur le bord pour des systèmes hyperboliques à caractéristiques de multiplicité constante. *C. R. Acad. Sci. Paris. Série A* **293** (1982), 637–639.
- [34] Propagation of singularities and inverse scattering problem for transparent obstacles. *J. Math. Pures Appl.* **60** (1982), 65–90.
- [35] Le problème inverse de diffusion pour les systèmes hyperboliques. Séminaire Equations aux Dérivées Partielles Hyperboliques et Holomorphes, Université Paris VI, Paris, 1981–1982.
- [36] Inverse scattering problem for transparent obstacles. *Math. Proc. Cambridge Phil. Soc.* **92** (1982), 361–367.
- [37] Asymptotic behaviour of the scattering phase for non-trapping obstacles. *Ann. Inst. Fourier (Grenoble)* **32** (1982), 111–149 (with G. Popov).
- [38] Construction d’une paramétrix microlocale et propagation des singularités sur le bord pour les systèmes hyperboliques. Journées EDP, Saint-Jean-de-Monts, Conférence No 11, Soc. Math. de France, 1982.
- [39] Distribution des pôles de la matrice de diffusion pour des obstacles captifs. *C. R. Acad. Sci. Paris, Série A* **295** (1982), 443–445.
- [40] La distribution des pôles de la matrice de diffusion. Séminaire Goulaouic-Meyer-Schwartz, Exposé No VII, Ecole Polytechnique, 1982–1983.
- [41] Asymptotique semi-classique d’hamiltoniens quantiques et trajectoires classiques périodiques. *C. R. Acad. Sci. Paris, Série A* **296** (1983), 553–556 (with D. Robert).
- [42] La représentation de l’application de Poincaré correspondant aux rayons périodiques réfléchissants. *C. R. Acad. Sci. Paris, Série A* **296** (1983), 633–635 (with P. Vogel).

- [43] Comportement asymptotique de la fonction spectrale et d'opérateur de Laplace-Beltrami sur une variété ayant des singularités coniques. *C. R. Acad. Sci. Paris, Série A* **297** (1983), 167–170 (with Pham de Lai).
- [44] Solutions des systèmes hyperboliques dissipatifs qui disparaissent quand $t \rightarrow \infty$. In: Séminaire Equations aux Dérivées Partielles Hyperboliques et Holomorphes (Ed. J. Vaillant), Hermann, Paris, 1984, 44–50.
- [45] Note on the distribution of poles of the scattering matrix. *J. Math. Anal. Appl.* **101** (1984), 582–587.
- [46] Singularities of the scattering kernel, pp. 288–296 in Nonlinear partial differential equations and their applications. Collège de France Seminar vol. **VI**, Pitman Research Notes in Mathematics Series **109**, Boston, 1984.
- [47] Asymptotique semi-classique de spectre d'hamiltoniens quantiques et trajectoires classiques périodiques. *Commun. Partial Differential Equations* **10** (1985), 365–390 (with D. Robert).
- [48] Propriétés génériques des rayons réfléchissants et applications aux problèmes spectraux. Séminaire Bony-Sjöstrand-Meyer, Exposé No. XII, Ecole Polytechnique, 1984–1985.
- [49] Propriétés génériques de l'application de Poincaré et des géodesiques périodiques généralisées. Séminaire EDP, Exposé No. XII, Ecole Polytechnique, 1985–1986 (with L. Stoyanov).
- [50] Periodic geodesics of generic non-convex domains in \mathbf{R}^2 and the Poisson relation. *Bull. Amer. Math. Soc.* **15** (1986), 88–90 (with L. Stoyanov).
- [51] Existence de l'opérateur de diffusion pour l'équation des ondes avec un potentiel périodique en temps. *C. R. Acad. Sci. Paris, Série A* **303** (1986), 671–673 (with A. Bachelot).
- [52] Théorème de type RAGE pour des opérateurs à puissances bornées. *C. R. Acad. Sci. Paris, Série A* **303** (1986), 605–608 (with V. Georgiev).
- [53] Poisson relation for manifolds with boundary. In: Hyperbolic Equations and Related Topics, Taniguchi Symposium Katata, 1984 (Ed. S. Mizohata), Tokyo Inc. Press, 1986, 317–327.
- [54] Inverse spectral problems. *Mathematics and Education in Mathematics* **15** (1986), 98–100.

- [55] Spectrum of the Poincaré map for periodic reflecting rays in generic domains. *Math. Zeitschrift* **194** (1987), 505–518 (with L. Stoyanov).
- [56] Periods of multiple reflecting geodesics and inverse spectral results. *Amer. J. Math.* **109** (1987), 617–668 (with L. Stoyanov).
- [57] Scattering theory for mixed problems in the exterior of moving obstacles. In: *Hyperbolic Equations* (Eds F. Colombini, M. K. V. Murthy), Pitman Research Notes in Mathematics Series vol. **158**, Longman Scientific & Technical, 1987, 141–155.
- [58] *Scattering Theory for Hyperbolic Operators*. Notas de Curso No 24, Universidade Federal de Pernambuco, Recife, 1987.
- [59] Singularities of the scattering kernel for non-convex obstacles. Journées EDP, Saint-Jean-de-Monts, Conférence No 11, Soc. Math. de France, 1987 (with L. Stoyanov).
- [60] Existence des opérateurs des ondes pour les systèmes hyperboliques avec un potentiel périodique en temps. *Ann.Inst. H. Poincaré (Physique théorique)*, **47** (1987), 383–428 (with A. Bachelot).
- [61] Leading singularity of the scattering kernel for moving obstacles. *C. R. Acad. Bulg. Sci.* **40** (1987), 5–9 (with Tsv. Rangelov).
- [62] On the number of periodic reflecting rays in generic domains. *Erg. Theory and Dynam. Systems* **8** (1988), 81–91 (with L. Stoyanov).
- [63] Propagation des singularités et l'apparition des ondes laterales pour des systèmes symétriques. In: *Calcul des Opérateurs et Front d'Onde*, (Ed. J. Vaillant), Hermann, Paris, 1988, 9–30.
- [64] Les problèmes inverses de diffusion pour les perturbations dépendant du temps. Séminaire EDP, Exposé No XX, Ecole Polytechnique, 1987–1988.
- [65] Existence de l'opérateur de diffusion pour l'équation des ondes avec un potentiel périodique en temps. In: *Nonlinear partial differential equations and their applications*, Collège de France Seminar, vol. **IX**, Pitman Research Notes in Mathematics Series, vol. **181**, Longman Scientific & Technical, 1988, 13–27 (with A. Bachelot).
- [66] Singularities of the scattering kernel for several strictly convex obstacles. *Trans. Amer. Math. Soc.* **320** (1989), 203–235 (with L. Stoyanov).

- [67] RAGE theorem for power bounded operators and decay of local energy for moving obstacles. *Ann. Inst. H. Poincaré (Physique théorique)* **51** (1989), 155–185 (with V. Georgiev).
- [68] Singularities of the scattering kernel for a class of star-shaped non-convex obstacles. *Mathematica Applicata e Computacional* **8** (1989), No 2, 167–176 (with L. Stoyanov).
- [69] Les singularités du noyau de l'opérateur de diffusion pour des obstacles non-convexes. Séminaire EDP, Exposé No. VIII, Ecole Polytechnique, 1989–1990.
- [70] Leading singularity of the scattering kernel for moving obstacles with dissipative boundary conditions. *Bolettino U. M. I.* **7** 4-B (1990), 567–589 (with F. Cardoso).
- [71] Leading singularity of the scattering kernel for moving obstacles. *Mathematica Balkanika (New Series)* **4** (1990), No 1, 91–112 (with Tsv. Rangelov).
- [72] Singularities of the scattering kernel for generic obstacles. *Ann. Inst. H. Poincaré (Physique théorique)* **53**, (1990), 445–466 (with F. Cardoso and L. Stoyanov).
- [73] Phase de diffusion pour des perturbations captives. Journées EDP, Saint-Jean-de-Monts, Soc. Math. de France, 1990.
- [74] Singularities of the scattering kernel for non-convex obstacles. In: Integral Equations and Inverse Problems, (Eds V. Petkov, R. Lazarov), Pitman Research Notes in Mathematics Series vol. **235**, Longman Scientific & Technical, 1991, 200–208.
- [75] Pôles de la matrice de diffusion pour des perturbations captifs. Séminaire EDP, Exposé No XV, Ecole Polytechnique, 1990–1991.
- [76] Le comportement de la résolvante modifiée du Laplacien pour des obstacles captifs. Séminaire EDP, Exposé No XVIII, Ecole Polytechnique, 1991–1992.
- [77] Upper bounds on the number of scattering poles and the Lax-Phillips conjecture. *Asymptotic Analysis* **7** (1993), 97–104 (with G. Vodev).
- [78] On the Lebesgue measure of the periodic points of a contact manifold. *Math. Z.* **218** (1995), 91–102 (with G. Popov).

- [79] Sojourn times of trapping rays and the behaviour of the modified resolvent of the Laplacian. *Ann. Inst. H. Poincaré (Physique théorique)* **62** (1995), 17–45 (with L. Stoyanov).
- [80] Sojourn times of reflecting rays and singularities of the scattering kernel. In: Third International Conference on Mathematical and Numerical Aspects of Wave Propagation, (Ed. Gary Cohen), SIAM, 1995, 516–525 (with L. Stoyanov).
- [81] Weyl asymptotic of the scattering phase for metric perturbations. *Asymptotic Analysis* **10** (1995), 245–261.
- [82] Une formule de trace semi-classique et asymptotiques des valeurs propres de l'opérateur de Schrödinger. *C. R. Acad. Sci. Paris, Série I* vol. **323** (1996), 163–168 (with G. Popov).
- [83] Sur la conjecture de Lax et Phillips pour un nombre fini d'obstacles strictement convexes. Séminaire EDP, Exposé No. XI, Ecole Polytechnique, 1995–1996.
- [84] Singularities of the scattering kernel for trapping obstacles. *Ann. Sci. Ec. Norm. Sup.* **29** (1996), 737–756 (with L. Stoyanov).
- [85] Semi-classical trace formula and clustering of eigenvalues for Schrödinger operators. *Ann. Inst. H. Poincaré (Physique Théorique)* **68** (1998), 17–83 (with G. Popov).
- [86] Variation de la phase de diffusion et distribution des résonances. Séminaire EDP, Exposé No XII, Ecole Polytechnique, 1998–1999 (with M. Zworski).
- [87] Analytic singularities of the dynamical zeta function. *Nonlinearity* **12** (1999), 1663–1681.
- [88] Breit-Wigner approximation and distribution of resonances. *Commun. Math. Physics* **204** (1999), 329–351; Erratum. *Commun. Math. Physics* **214** (2000), 733–735 (with M. Zworski).
- [89] Semiclassical resolvent estimates for trapping perturbations. *Commun. Math. Physics* **213** (2000), 413–432 (with V. Bruneau).
- [90] Scattering amplitude and Poisson relation in obstacle scattering. *Cubo Mat. Educ.* **3**, (2000), 361–374.

- [91] Semi-classical resolvent estimates and spectral asymptotics for trapping perturbations. In: Partial differential equations and spectral theory (Eds Michael Demuth et al.). Proceedings of the PDE 2000 conference, Clausthal, Oper. Theory, Adv. Appl. **126** (2001), 37–40, Birkhäuser, Basel (with V. Bruneau).
- [92] Semi-classical estimates on the scattering determinant. *Annales Henri Poincaré* **2** (2001), 675–711 (with M. Zworski).
- [93] Representation of the scattering shift function and spectral asymptotics for trapping perturbations. *Commun. Partial Diff. Equations* **26** (2001), 2081–2119 (with V. Bruneau).
- [94] Lower bounds on the number of scattering poles for several strictly convex obstacles. *Asymptotic Analysis* **30** (2002), 81–91.
- [95] Meromorphic continuation of the spectral shift function. *Duke Math. J.* **116** (2003), 389–430 (with V. Bruneau).
- [96] Eigenvalues of the reference operator and semiclassical resonances. *J. Funct. Anal.* **202** (2003), 571–590 (with V. Bruneau).
- [97] Sojourn times, singularities of the scattering kernel and inverse problems. Inside Out, Inverse Problems, Publications of MSRI, vol. **47**, 2003, 297–332, Cambridge University Press (with L. Stoyanov).
- [98] Spectral shift function and resonances for non semi-bounded and Stark Hamiltonians. *J. Math. Pures Appl.* **82** (2003), 1303–1342 (with M. Dimassi).
- [99] Resonances for non-trapping time periodic perturbations. *J. Phys. A: Math. Gen.* **37** (2004), 9439–9449 (with J. F. Bony).
- [100] Resonances for magnetic Stark hamiltonians in two dimensional case. *Internat. Math. Res. Notices* **77** (2004), 4147–4179 (with M. Dimassi).
- [101] Semiclassical resonances and trace formulae for non semi-bounded Hamiltonians. Exposé no. XI, Séminaire EDP, Ecole Polytechnique, 2003–2004 (with M. Dimassi).
- [102] Estimates of the cut-off resolvent for trapping obstacles. Exposé No II, Séminaire EDP, Ecole Polytechnique, 2005–2006 (with J. F. Bony).

- [103] Global Strichartz estimates for wave equation with time-periodic perturbations. *J. Funct. Anal.* **235** (2006), 357–376.
- [104] Local energy decay and Strichartz estimates for the wave equation with time-periodic perturbations. *Progr. Nonlinear Differential Equations Appl.* **69** (2006), 267–285, Birkhäuser, Boston.
- [105] Resolvent estimates and local energy decay of hyperbolic equations. *Ann. Univ. Ferrara Sez. VII (N.S.)* **52** (2006), No 2, 233–246 (with J. F. Bony).
- [106] Singularities of the scattering kernel related to trapping rays. Preprint, 2006 (with L. Stoyanov).
- [107] Analytic continuation of the resolvent of the Laplacian and the dynamical zeta function. *C. R. Acad. Sci. Paris, Ser. I* **345** (2007), 567–572 (with L. Stoyanov).
- [108] Dynamical zeta function for several strictly convex obstacles. *Canad. Math. Bull.* **51** (2008), No 1, 100–113.
- [109] Exponential growth for the wave equation with compact time-dependent positive potential. *Comm. Pure Appl. Math.*, to appear (with F. Colombini and J. Rauch).