

## LITERATURA

- Arabej, S. M., S. F. Shkirman, K. N. Solov'ev (1977) Anisotropy of light emission and absorption by porphin molecules in n-octane single crystals. Spectr. Lett. 10, 677-697.
- Arabej, S. M., G. D. Egorova, K. N. Solovyev, S. F. Shkirman (1982a) Kvaziliněčatyje spektry i anizotropija individualnych vibronnych perechodov v molekulach izomerov tetragidroporfina. Zh. Priklad. Spektrosk. 36, 616-622.
- Arabej, S. M., K. N. Solovyev, G. D. Egorova, S. F. Shkirman (1982b) Anizotropija ispuskanija sveta molekulami Zn-porfina v monokristalle n-oktana. Zh. Priklad. Spektrosk. 37, 600-604.
- Arábei, S. M., G. D. Egorova, K. N. Solovyev, S. F. Shkirman (1984) Spektralnyje i fotochimické svojstva molekuljarnych centrov mezo-tetrapropilchlorina v matrice n-oktana pri 4,2 K. Zh. Priklad. Spektrosk. 40, 92-98.
- Aronowitz, Y. J., M. Gouterman (1977) Effect of metal and substituents on the quasi-line spectra of some metalloporphyrins. J. Mol. Spectrosc. 64, 267-289.
- Avarmaa, R. A., K. K. Rebane (1973) Kvaziliněčatyje spektry molekul chlorofilla. Izv. Akad. Nauk ESSR 22, 108-110.
- Avarmaa, R. A. (1974) Liněčataja struktura v nizkotemperaturnych spektrach chlorofilla v nealkanovych matricach. Izv. Akad. Nauk ESSR 23, 93-94.
- Avarmaa, R. A., K. K. Rebane (1975) Fine structure spectra of chlorophyll molecules in solid solutions. Studia biophysica 48, 209-218.
- Avarmaa, R. A., K. K. Mauring (1978) Kvaziliněčataja struktura v spektrach ljuminescencji chlorofilopodobnych molekul pri monochromatičeskom vozbužděniyu. Zh. Priklad. Spektrosk. 28, 658-662.
- Avarmaa, R. A., T. J. Schaafsma (1980) Site-selected fluorescence detection of magnetic resonance of protochlorophyll and related chlorophylls. Chem. Phys. Lett. 71, 339-344.
- Avarmaa, R. A., R. Tamkivi (1980) Feoforbidy - bližajščije k chlorofillu sojediněniya, oblagajuščije spektrami Špolskogo. Izv. Akad. Nauk ESSR 29, 442-444.
- Avarmaa, R. A., R. Tamkivi, S. Kiisler, V. Nömm (1980) Tonkostrukturnyje vibronnyje spektry molekul chlorofilla i jego proizvodnych v tverdyh rastvorach pri vozbužděniyu perestraivajemym lazerom na krasitěle. Izv. Akad. Nauk ESSR 29, 39-45.
- Avarmaa, R. A. (1982) Tonkostrukturnyje spektry i kinetika ljuminescencji chlorofilla i jego proizvodnych. Izv. Akad. Nauk. ESSR 31, 133-138.
- Avarmaa, R. A., A. Suisalu (1984a) Primeněniye optogalvaničeskogo effekta dlja kalibrovki dliny volny v tonkostrukturnoj spektroskopiji. Izv. Akad. Nauk ESSR 33, 333-338.
- Avarmaa, R. A., A. Suisalu (1984b) Poljarizacijonnyje spektry molekul chlorofilla pri selektivnom lazernom vozbužděniyu. Opt. Spektrosk. 56, 53-59.

- Avarmaa, R. A., I. Renge, K. K. Mauring (1984) Sharp-line structure in the fluorescence and excitation spectra of greening etiolated leaves. *FEBS Lett.* **167**, 186–190.
- Avarmaa, R. A., K. K. Rebane (1985) High-resolution optical spectra of chlorophyll molecules. *Spectrochim. Acta* **41A**, 1365–1380.
- Avarmaa, R. A., I. Renge (1986) Vibronno-selektivnyje spektry bakterialnogo chlorofilla v tverdem rastvore. *Izv. Akad. ESSR* **35**, 432–434.
- Avarmaa, R. A., R. Jaaniso, K. K. Mauring, I. Renge, R. Tamkivi (1986) Influence of energy transfer on the structure of site-selection spectra of molecules. *Mol. Phys.* **57**, 605–621.
- Bajema, L., M. Gouterman, B. Meyer (1968) Spectra of porphyrins XI. Absorption and fluorescence spectra of matrix isolated phthalocyanines. *J. Mol. Spectrosc.* **27**, 225–235.
- Bajema, L., M. Gouterman, C. B. Rose (1971) Porphyrins XXIII: Fluorescence of the second excited singlet and quasiline structure of zinc tetrabenzporphin. *J. Mol. Spectrosc.* **39**, 421–431.
- Barth, G., R. E. Linder, N. Waespe-Sarcevic, E. Bunnenberg, C. Djerassi, Y. J. Aronowitz, M. Gouterman (1977) Magnetic circular dichroism studies. Part 45. A comparison between the magnetic circular dichroism and Shpol'skii spectra of palladium, zinc a magnesium porphin. *J.C.S. Perkin II*, 337–343.
- Beck, J., G. H. Kaiser, J. U. von Schütz, H. C. Wolf (1981) Optically excited triplet states in the bacteria Rhodopseudomonas sphaeroides „wild-type“ detected by magnetic resonance in zero-field. *Biochim. Biophys. Acta* **634**, 165–173.
- van der Bent, S. J., T. J. Schaafsma (1978) Zero field optically detected magnetic resonance (ODMR) of dihydroporphin. *J. Chem. Phys.* **68**, 1857–1861.
- Blauer, G., H. Sund, eds. (1985) Optical Properties and Structure of Tetrapyrroles. (W. de Gruyter, Berlin–New York).
- Bohandy, J., B. F. Kim, C. K. Jen (1973) Low-temperature optical absorption spectra of hematoporphyrins. *J. Mol. Spectrosc.* **45**, 199–207.
- Bohandy, J., B. F. Kim (1979) Conventional and dye laser optical spectra of zinc porphin in anthracene. *Spectrochim. Acta* **35A**, 415–420.
- Bohandy, J., B. F. Kim (1980) Temperature dependence of Mg porphin, Cu porphin and Pd porphin luminescence. *J. Chem. Phys.* **73**, 5477–5481.
- Bohandy, J., B. F. Kim (1982) Fluorescence of Mg porphin in anthracene. *J. Chem. Phys.* **76**, 1180–1181.
- Bohandy, J., B. F. Kim (1983) Anomalous temperature-dependent phosphorescence of Cu porphin in anthracene. *J. Chem. Phys.* **78**, 4331–4336.
- Bondybey, V. E., J. H. English (1979) Spectra of the H<sub>2</sub> phthalocyanine in low-temperature matrices. *J. Amer. Chem. Soc.* **101**, 3446–3450.
- Boxer, S. G., A. Kuki, D. J. Lockhart, T. R. Middendorf, R. Moog (1985) Electron and energy transfer in real and artificial photosynthetic systems. In Proceedings of the Fifth International Seminar on Energy Transfer (P. Pančoška, J. Pantoflíček, eds.) 108–115.
- Boxer, S. G., D. J. Lockhart, T. R. Middendorf (1986a) Photochemical hole-burning in photosynthetic reaction centers. *Chem. Phys. Lett.* **123**, 476–482.
- Boxer, S. G., T. R. Middendorf, D. J. Lockhart (1986b) Reversible photochemical holeburning in Rhodopseudomonas viridis reaction centers. *FEBS Lett.* **200**, 237–241.
- Boxer, S. G., D. S. Gottfried, D. J. Lockhart, T. R. Middendorf (1987a) Nonphotochemical holeburning in a protein matrix: Chlorophyllide in apomyoglobin. *J. Chem. Phys.* **86**, 2439–2441.
- Boxer, S. G., D. J. Lockhart, T. S. Middendorf (1987b) Photochemical holeburning and Stark spectroscopy of photosynthetic reaction centers. In Springer Series, in press.
- van Brakel, G. H. (1982) The triplet state of chlorophyll-a in whole algal cells. Thesis, Agricultural Univ., Wageningen.
- Breton, J. (1985) Orientation of the chromophores in the reaction center of Rhodopseudomonas viridis. Comparison of low-temperature linear dichroism spectra with a model derived from X-ray crystallography. In *Antennas and Reaction Centers of Photosynthetic Bacteria*, ed. M. E. Michel-Beyerle (Springer Verlag, Berlin–Heidelberg–New York–Tokyo) 109–121.

- Burkhalter, F. A., U. P. Wild (1982) Energy selection experiments in glassy matrices: The fluorescence spectrum of a synthetic isobacteriochlorin. *Chem. Phys.* **66**, 327–331.
- Burkhalter, F. A., G. W. Suter, U. P. Wild, V. D. Samoilenco, N. V. Rasumova, R. I. Personov (1983) Hole burning in the absorption spectrum of chlorin in polymer films: Stark effect and temperature dependence. *Chem. Phys. Lett.* **94**, 483–487.
- Burns, M. J., W. K. Liu, A. H. Zewail (1983) Nonlinear laser spectroscopy and dephasing of molecules: An experimental and theoretical overview. In *Spectroscopy and Excitation Dynamics of Condensed Molecular Systems*, eds. V. M. Agranovic, R. M. Hochstrasser (North-Holland, Amsterdam–New York–Oxford) 301–435.
- Bykovskaya, L. A., A. T. Gradyushko, R. I. Personov, J. V. Romanovskii, K. N. Solovyev, A. S. Starukhin, A. M. Shulga (1978) Poljarnizovannaja fluorescencija porfina i jego proizvodnych pri selektivnom lazernom vozbužděniji. *Zh. Priklad. Spektrosk.* **29**, 1088–1098.
- Bykovskaya, L. A., R. I. Personov, J. V. Romanovskii (1979) Liněčatyje spektry fluorescenci tetrafenillporfina pri selektivnom lazernom vozbužděniji i opredělenije simmetriji kolebanij v vozbužděnnom elektronnom sostojaniji. *Zh. Priklad. Spektrosk.* **31**, 910–914.
- Bykovskaya, L. A., F. F. Litvin, R. I. Personov, J. V. Romanovskii (1980) Tonkaja struktura spektrov fluorescenciji chlorofilla-a, protochlorofilla i ich feofitinov pri selektivnom lazernom vozbužděniji. *Biofizika* **25**, 13–20.
- Callis, J. B., M. Gouterman, Y. M. Jones, B. H. Henderson (1971) Porphyrins XXII: Fast fluorescence, delayed fluorescence, and quasiline structure in palladium and platinum complexes. *J. Mol. Spectrosc.* **39**, 410–420.
- Canters, G. W., J. van Egmond, T. J. Schaafsma, J. H. van der Waals (1972) Optical and Zeeman studies of the first excited singlet state of zinc porphin in a single crystal of n-octane: Evidence for Jahn-Teller instability. *Mol. Phys.* **24**, 1203–1215.
- Canters, G. W., M. Noort, J. H. van der Waals (1975) Zeeman effect in the Q-band absorption spectrum of palladiumporphin in an n-octane single crystal. *Chem. Phys. Lett.* **30**, 1–4.
- Canters, G. W., G. Jansen, M. Noort, J. H. van der Waals (1976) High resolution Zeeman experiments on singlet, triplet and quartet states of metalloporphines. *J. Phys. Chem.* **80**, 2253–2258.
- Canters, G. W., J. H. van der Waals (1978) High resolution Zeeman spectroscopy of metalloporphyrins. In *The Porphyrins III*, ed. D. Dolphin (Academic Press, New York–San Francisco–London) 531–582.
- Canters, G. W., J. A. Kooter, N. van Dijk, J. H. van der Waals (1979) Zeeman experiments on the orbitally degenerate phosphorescing triplet and quartet states of palladium and copper porphin. *J. Luminesc.* **18/19**, 196–200.
- Canters, G. W. (1981a) Crystal field effects on the vibronic properties of the Jahn-Teller unstable  $S_1$  state of zinc porphin. *J. Chem. Phys.* **74**, 157–162.
- Canters, G. W. (1981b) Magnetic-field-induced electronic relaxation in the  $^1E_u$  state of metalloporphyrins. *Chem. Phys. Lett.* **81**, 266–269.
- Carter, T. P., G. J. Small (1985) Non-photochemical hole burning of chlorophyll-a and -b in polystyrene. *Chem. Phys. Lett.* **120**, 178–182.
- Carter, T. P., G. J. Small (1986) Nonphotochemical hole burning of self-aggregated dimers of chlorophyll-a in polystyrene. *J. Phys. Chem.* **90**, 1997–1998.
- Chan, I. Y., W. G. van Dorp, T. J. Schaafsma, J. H. van der Waals (1971a) The lowest triplet state of Zn porphin I. Modulation of its phosphorescence by microwaves. *Mol. Phys.* **22**, 741–751.
- Chan, I. Y., W. G. van Dorp, T. J. Schaafsma, J. H. van der Waals (1971b) The lowest triplet state of Zn porphin II. Investigation of its dynamics by microwave induced delayed phosphorescence. *Mol. Phys.* **22**, 753–769.
- Chen, W. H., L. E. Rieckhoff, E. M. Voigt (1984) Thermostable sites of palladium phthalocyanine in Shpolskii matrices of mixed solvents. *Can. J. Chem.* **62**, 2264–2272.
- Chen, W. H., K. E. Rieckhoff, E. M. Voigt (1985) Zeeman study of the phosphorescent state of palladium phthalocyanine in Shpolskii matrices. *Chem. Phys.* **95**, 123–133.

- Chen, W. H., K. E., Rieckhoff, E. M. Voigt (1986) The dynamics of palladium phthalocyanine excited states in magnetic fields at low temperatures. *Chem. Phys.* 102, 193–203.
- Clarke, R. H., R. H. Hofeldt (1947a) Optical detection of zero field magnetic resonance in the triplet state of chlorophyll-*b*. *J. Amer. Chem. Soc.* 96, 3005.
- Clarke, R. H., R. H. Hofeldt (1974b) Optically detected zero field magnetic resonance studies of the photoexcited triplet states of chlorophyll-*a* and -*b*. *J. Chem. Phys.* 61, 4582–4587.
- Clarke, R. H., R. E. Connors (1975) Radiationless deactivation rates of the lowest triplet state of tetraphenylporphin at 2 K. *J. Chem. Phys.* 62, 1600–1601.
- Devolder, P., N. van Dijk, H. P. H. Thijssen, J. H. van der Waals (1981) Photo-selection and Zeeman experiments on the phosphorescence of platinum porphin between 1,3 K and 77 K. *Mol. Phys.* 43, 335–350.
- Dicker, A. I. M., M. Noort, S. Völker, J. H. van der Waals (1980) Zeeman experiments on free-base porphin by means of photochemical hole-burning. *Chem. Phys. Lett.* 73, 1–5.
- Dicker, A. I. M., J. Dobkowski, S. Völker (1981a) Optical dephasing of the  $S_1 \rightarrow S_0$  transition of free-base porphin in an n-decane host studied by photochemical hole-burning: A case of slow exchange: *Chem. Phys. Lett.* 84, 415–420.
- Dicker, A. I. M., M. Noort, H. P. H. Thijssen, S. Völker, J. H. van der Waals (1981b) Zeeman effect of the  $S_1 \leftarrow S_0$  transition of the two tautomeric forms of chlorin: A study by photochemical hole burning in an n-hexane host at 4,2 K. *Chem. Phys. Lett.* 78, 212–218.
- Dicker, A. I. M. (1982) High resolution spectroscopy of porphins via photochemical hole-burning. Thesis, University of Leyden.
- Dicker, A. I. M., S. Völker (1982) Influence of the host on vibronic relaxation: A study of free-base porphin in a series of n-alkanes by photochemical hole-burning. *Chem. Phys. Lett.* 87, 481–486.
- Dicker, A. I. M., J. Dobkovski, M. Noort, S. Völker, J. H. van der Waals (1982) Zeeman effect on the  $S_1 \rightarrow S_0$  transition of the photoisomer of chlorin in different sites in n-hexane studied by photochemical hole-burning. *Chem. Phys. Lett.* 88, 135–137.
- Dicker, A. I. M., L. W. Johnson, S. Völker, J. H. van der Waals (1983a) Homogeneous linewidth and optical dephasing of the  $S_1 \leftarrow S_0$  transition of magnesium porphin in an noctane crystal: A study by transient and photochemical hole-burning. *Chem. Phys. Lett.* 100, 8–14.
- Dicker, A. I. M., L. W. Johnson, M. Noort, J. H. van der Waals (1983b) Stark effect on the  $S_1 \leftarrow S_0$  transition of the two tautomeric forms of chlorin studied by photochemical hole-burning in n-hexane and n-octane single crystals at 1,2 K. *Chem. Phys. Lett.* 94, 14–19.
- Dolphin, D., ed. (1978) The Porphyrins I–VII. (Academic Press, New York–San Francisco–London).
- van Dorp, W. G., T. J. Schaafsma, M. Soma, J. H. can der Waals (1973) Investigation of the lowest triplet state of free base porphin by microwave induced changes in its fluorescence. *Chem. Phys. Lett.* 21, 221–225.
- van Dorp, W. G., M. Soma, J. A. Kooter, J. H. van der Waals (1974) Electron spin resonance in the photo-excited triplet state of free base porphin in a single crystal of n-octane. *Mol. Phys.* 28, 1551–1568.
- Dvornikov, S. S., V. N. Knyukshto, K. N. Solovyev, I. V. Stanishevskii, A. S. Staruchin, A. E. Turkova (1984) Opredelenije položenija urovna  $S_2$  molekul chlorofilov metodami poljarizovannoj ljuminescenciji i tonkostrukturnoj spektroskopiji. *Opt. Spektrosk.* 57, 234–238.
- Eastwood, D. a M. Gouterman (1969) Porphyrins XII. Luminescence of copper complexes at liquid nitrogen temperature. *J. Mol. Spectrosc.* 30, 437–458.
- Egorova, G. D., V. N. Knyukshto, K. N. Solovyev, M. P. Cvirko (1981) Poljarizacija fosforescenciji chlorofyllpodobnych molekul. Dualnaja fosforescencija metallokomplexov mezoarilchlorinov. *Opt. Spektrosk.* 50, 179–185.
- Even, U., Y. Magen, J. Jortner, H. Levanon (1981) Excited-state energetics and dynamics of magnesium tetraphenylporphyrin cooled in supersonic expansions. *J. Amer. Chem. Soc.* 103, 4583–4585.

- Even, U., J. Jortner (1982) Isolated ultracold porphyrins in supersonic expansions. III. Free-base porphine. *J. Chem. Phys.* 77, 4391–4399.
- Even, U., J. Jortner, J. Friedman (1982a) Excited-state energetics and dynamics of zinc tetrabenzoporphine in supersonic expansions. *J. Phys. Chem.* 86, 2273–2276.
- Even, U., J. Magen, J. Jortner, J. Friedman (1982b) Isolated ultracold porphyrins in supersonic expansions. II. Zn-tetrabenzoporphyrin. *J. Chem. Phys.* 77, 4384–4390.
- Even, U., J. Magen, J. Jortner (1982c) Laser spectroscopy of the isolated ultracold free-base porphin. *Chem. Phys. Lett.* 88, 131–134.
- Even, U., J. Magen, J. Jortner, H. Levanon (1982d) Electronic excitations of magnesium tetraphenylporphyrin in supersonic expansions. *J. Chem. Phys.* 76, 5684–5692.
- Even, U., J. Magen, J. Jortner, J. Friedman, H. Levanon (1982e) Isolated ultracold porphyrins in supersonic expansions. I. Free-base tetraphenylporphyrin. *J. Chem. Phys.* 77, 4374–4383.
- Even, U., J. Jortner (1983) Complexing of porphyrins in supersonic jets. *J. Phys. Chem.* 87, 28–29.
- Feher, G. (1971) Some chemical and physical properties of a bacterial reaction center particle and its primary photochemical reactants. *Photochem. Photobiol.* 14, 373–387.
- Fitch, P. S. H., L. Wharton, D. H. Levy (1978) The fluorescence excitation spectrum of free base phthalocyanine cooled in a supersonic expansion. *J. Chem. Phys.* 69, 3424–3426.
- Fitch, P. S. H., C. A. Haynam, D. H. Levy (1980) The fluorescence excitation spectrum of the free base phthalocyanine cooled in a supersonic free jet. *J. Chem. Phys.* 73, 1064–1072.
- Fitch, P. S. H., C. A. Haynam, D. H. Levy (1981) Intramolecular vibrational relaxation in jet-cooled phthalocyanine. *J. Chem. Phys.* 74, 6612–6620.
- Fong, F. K., ed. (1982) *Light Reaction Path of Photosynthesis*. (Springer Verlag, Berlin-Heidelberg-New York).
- French, C. S. (1971) The distribution and action in photosynthesis of several forms of chlorophyll. *Proc. Nat. Acad. Sci. USA* 68, 2892–2897.
- Fünfschilling, J., D. F. Williams (1975) vibrationally resolved low temperature fluorescence spectra of porphin and chlorophylls-a and -b in organic glass matrices. *Photochem. Photobiol.* 22, 151–152.
- Fünfschilling, J., D. F. Williams (1976) CW laser wavelength modulation in Raman and site selection fluorescence spectroscopy. *Appl. Spectrosc.* 30, 443–446.
- Fünfschilling, J., D. F. Williams (1977) Fluorescence spectra of chlorophyll-a and chlorophyll-b from site selection spectroscopy. *Photochem. Photobiol.* 26, 109–113.
- Fünfschilling, J., I. Zschokke-Gränacher (1981) The determination of the site-energy distribution of organic molecules dissolved in glassy matrices. *J. Chem. Phys.* 75, 3669–3673.
- Fünfschilling, J., I. Zschokke-Gränacher (1982) The determination of the distribution of site energies of chlorophyll-b in an organic glass. *Chem. Phys. Lett.* 91, 122–125.
- Fünfschilling, J., D. Walz (1983) Site-selection spectroscopy of chlorophyll-b in membranes of lecithin vesicles and in other solvents. *Photochem. Photobiol.* 38, 389–393.
- Ganago, A. O., A. N. Melkozernov, V. A. Shuvalov (1986) Issledovaniye reakcijnych centrov iz fotosintezirujuščej bakteriji Rhodopseudomonas sphaeroides R-26 metodom spektroskopii vyžiganija provalov. *Biofiz.* 31, 440–443.
- Gillie, J. K., B. L. Fearey, J. M. Hayes, G. J. Small, J. H. Golbeck (1987) Persistent hole burning of the primary donor state of photosystem I: Strong linear electron-phonon coupling. *Chem. Phys. Lett.* 134, 316–322.
- Gorokhovskii, A. A., R. K. Kaarli (1975) O neodnorodnom ušireniji i strukture multipletov v spektrach  $H_2$ -ftalocianina v n-oktaně pri 4,2 K. *Izv. Akad. Nauk SSSR* 39, 2326–2330.
- Gorokhovskii, A. A. (1976) Struktura multipletov i neodnorodnoje uširenije v spektrach  $H_2$ -ftalocianina v n-oktaně pri 4,2 K. *Opt. Spektrosk.* 40, 477–482.
- Gorokhovskii, A. A., R. K. Kaarli, L. A. Rebane (1976) The homogeneous, pure electronic linewidth in the spectrum of a  $H_2$ -phthalocyanine solution in n-octane at 5 K. *Opt. Commun.* 16, 282–284.

- Gorokhovskii, A. A., J. V. Kikas, V. V. Palm, L. A. Rebane (1982) Osobennosti vyžiganija provala v spektrach organičeskich molekul v stěkloobraznyh matricach. Izv. Akad. Nauk SSSR 46, 952–956.
- Gorokhovskii, A. A., V. Korrovits, V. V. Palm, T. Trummal (1986) Temperature broadening of a photochemical hole in the spectrum of H<sub>2</sub>-octaethylporphin in polystyrene between 0,05 and 1,5 K. Chem. Phys. Lett. 125, 355–359.
- Gouterman, M. (1978) Optical spectra and electronic structure of porphyrins and related rings. In The Porphyrins III, ed. D. Dolphin (Academic Press, New York–San Francisco–London) 1–165.
- Govindjee, ed. (1987) Photosynthesis, (upravený ruský překlad MIR, Moskva).
- Gradyushko, A. T., V. A. Mashenkov, K. N. Solovyev (1969) Issledovaniye metallokompleksov porfina metdcem kvaziliněčatych spektrov. Biofiz. 14, 826–835.
- Gradyushko, A. T., V. A. Mashenkov, K. N. Solovyev (1971) Kvaziliněčatyje spektry fosforescenciji i poglošenija metallokompleksov tetrabenzoporfina. Zh. Priklad. Spektrosk. 15, 265–271.
- Gradyushko, A. T., K. N. Solovyev, S. G. Khokhlova (1974) Kvaziliněčatyje spektry ljuminescenciji metallokompleksov etioporfina. Zh. Priklad. Spektrosk. 21, 252–257.
- Gradyushko, A. T., K. N. Solovyev, A. S. Starukhin, A. M. Shulga (1975) Zerkalnaja simmetrija kvaziliněčatych spektrov poglošenija i fluorescenciji i elektronno-kolebatělnoje vzaimodějstvije v molekulach porfina i jego dejtěroproizvodnyh. Izv. Akad. Nauk SSSR 39, 1938–1943.
- Gradyushko, A. T., K. N. Solovyev, A. S. Starukhin (1976) Elektronno-kolebatělnoje vzaimodějstvije i zerkalnaja simmetrija kvaziliněčatych spektrov poglošenija i fluorescenciji porfirinov I. Porfin. Opt. Spektrosk. 40, 469–476.
- Gradyushko, A. T., K. N. Solovyev, A. S. Starukhin (1977) Elektronno-kolebatělnoje vzaimodějstvije i zerkalnaja simmetrija porfirinov II. Dejtěrozameščennyje porfina. Opt. Spektrosk. 43, 70–78.
- Gutiérrez, A. R. (1980) Optical hole burning and matrix effects in a phthalocyanine complex of ruthenium (II). Chem. Phys. Lett. 74, 293–297.
- Gutiérrez, A. R., G. Castro, G. Schulte, D. Haarer (1983) Dynamical linewidth effects of hole burning of free base phthalocyanine in polymers: Spectral diffusion and exchange narrowing. in Organic Molecular Aggregates, eds. P. Reineker, H. Haken, H. C. Wolf, (Springer-Verlag Berlin–Heidelberg–New York–Tokyo) 206–214.
- Hála, J. (1975) Nízkoteplotní spektra chlorofylu-a v polymerních matricích. Diplomová práce, MFF UK Praha.
- Hála, J. (1976) Nízkoteplotní spektroskopie ftalocyaninu. Rigorózní práce, MFF UK Praha.
- Hála, J., D. Monchor, E. Vavřinec (1976) Low temperature properties of chlorophyll-a. In Proceedings of the Third International Seminar on Energy Transfer (K. Vacek, J. Fiala eds.) 136–140.
- Hála, J. (1977) Low-temperature absorption and fluorescence spectra of phthalocyanine in n-alkanes and in polyethylene (Shpol'skii effect). Czech. J. Phys. B27, 1178–1180.
- Hála, J., J. Nauš, K. Vacek (1980) Nízkoteplotní spektroskopie složitých organických molekul (Špol'ského jev). Čs. čas. fyz. A30, 579–588.
- Hála, J. (1980) Nízkoteplotní spektroskopie ftalocyaninu a chlorofylu v matricích normálních alkanů. Kandidátská dizertační práce, MFF UK Praha.
- Hála, J., I. Pelant, L. Parma, K. Vacek (1981a) Site selection spectroscopy of chlorophyll-a in normal alkanes. J. Luminesc. 26, 117–128.
- Hála, J., I. Pelant, L. Parma, K. Vacek (1981b) Site selection spectroscopy of chlorophyll-a in n-alkanes and polystyrene matrices. In Proceedings of the Fourth International Seminar on Energy Transfer (J. Pantofliček, L. Zachoval eds.) 127–131.
- Hála, J., I. Pelant, L. Parma, K. Vacek (1981c) Site selection spectroscopy of chlorophyll-a. J. Luminesc. 24/25, 803–806.

- Hála, J., I. Pelant, L. Parma, K. Vacek (1982) Low temperature laser fluorescence and excitation spectra of free base phthalocyanine in normal alkanes matrices (Shpol'skii effect). Czech. J. Phys. *B*32, 705–710.
- Hála, J., M. Ambrož, I. Pelant, P. Pančoška, K. Bláha, K. Vacek (1984) Site-selection spectroscopy of pheophorbide-polypeptide model photosynthetic system. In Summer School of Modern Spectroscopic Methods in Chemical Physics and Biophysics 91–92.
- Hála, J. (1985a) Špol'ského spektroskopie. Ve Sborníku 8. konference čs. fyziků 343–346.
- Hála, J. (1985b) Site selection spectroscopy of model photosynthetic systems. In Proceedings of the Fifth International Seminar on Energy Transfer (P. Pančoška, J. Pantoflíček eds.) 131–136.
- Hála, J., P. Douša, M. Ambrož, I. Pelant, K. Vacek (1985a) Site selection spectra of tetraphenylporphyrin-aminoacid systems. In Proceedings of the Fifth International Seminar on Energy Transfer (P. Pančoška, J. Pantoflíček, eds.) 247–250.
- Hála, J., Pelant, M. Ambrož, P. Pančoška, K. Vacek (1985b) Site-selection and Shpol'skii spectroscopy of model photosynthetic systems. Photochem. Photobiol. *41*, 643–648.
- Hála, J., I. Pelant, M. Ambrož, P. Pančoška, K. Vacek (1985c) Site-selection and Shpol'skii spectroscopy of photosynthetic systems. In Spring School – Creation and Deactivation of Excited States of Biological Molecules 50–54.
- Hála, J., M. Ambrož, I. Pelant (1985d) Nízkoteplotní trojkyveta s proměnnou tloušťkou. ZN 208/85 MFF UK.
- Hála, J., I. Pelant, M. Ambrož, P. Douša, K. Vacek (1986a) Site-selection spectroscopy of tetraphenylporphyrin aminoacid model photosynthetic systems. Chem. Phys. Lett. *123*, 437–440.
- Hála, J., M. Ambrož, P. Pančoška, I. Pelant, K. Vacek (1986b) Site selection spectroscopy of model systems in photosynthesis. in Proceedings of the First Symposium on Laser Spectroscopy (P. Németh ed.) 238–253.
- Hála, J., G. F. W. Searle, T. J. Schaafsma, A. van Hoek, P. Pančoška, K. Bláha, K. Vacek (1986c) Picosecond laser spectroscopy and optically detected magnetic resonance on model photosynthetic system. Photochem. Photobiol. *44*, 527–534.
- Hála, J., I. Pelant, M. Ambrož (1987a) Low temperature spectroscopy of porphyrins in polymer hosts. Coll. & Polym. Sci. (v tisku).
- Hála, J., K. Vacek, M. Ambrož, K. Grof, P. Pančoška, I. Pelant (1987b) High resolved optical spectroscopy of model photosynthetic systems. Izv. Akad. Nauk ESSR, v tisku.
- Hála, J., I. Pelant, K. Grof, M. Ambrož, P. Pančoška, K. Vacek (1987c) Low temperature fluorescence of porphyrins: Chlorin methylester derivatives. Czech. J. Phys., v tisku.
- Hoff, A. J. (1985) Optical spectra of photosynthetic reaction centers, theoretical and experimental aspects. In Optical Properties and Properties of Tetrapyrroles, G. Blauer, H. Sund, eds. (W. de Gruyter, Berlin–New York) 454–473.
- Hoshino, M. (1985) Photo-induced dissociation of oxygen from dioxygen adduct of cobalt (II) tetraphenylporphyrin studied by laser photolysis at low temperature. Chem. Phys. Lett. *120*, 50–52.
- Huang, T. H., K. E. Rieckhoff, E. M. Voight (1979) Platinum phthalocyanine symmetry and singlet-triplet energy transfer from electronic and vibronic Shpol'skii spectra. Chem. Phys. *36*, 423–436.
- Huang, T. H., K. E. Rieckhoff, E. M. Voight (1981) New singlets in the phthalocyanines. J. Phys. Chem. *85*, 3322–3326.
- Huang, T. H., K. E. Rieckhoff, E. M. Voight (1982) Shpol'skii effect and vibronic spectra of the phthalocyanines. J. Chem. Phys. *77*, 3424–3441.
- Huang, T. H., W. H. Chen, K. E. Rieckhoff, E. M. Voight (1984) Resonance Raman, fluorescence and phosphorescence of palladium phthalocyanine in Shpol'skii matrices. J. Chem. Phys. *80*, 4051–4064.
- Janiso, R. V. (1982) Model prevraščenija centrov pri vyžiganiji provala v spektrach chlorofilla. Izv. Akad. Nauk ESSR *31*, 161–165.
- Jansen, G. M. Noort (1976) High resolution spectra of zinc porphin and magnesium porphinin

- a n-octane matrix at 4,2 K. Effect of the addition of ethanol and other solvents. *Spectrochim. Acta* **32A**, 747–753.
- Jansen, G., J. H. van der Waals (1976) The triplet state of magnesiumporphin ethanol in n-octane crystal studied by microwave induced changes in the fluorescence intensity. *Chem. Phys. Lett.* **43**, 413–416.
- Jansen, G., M. Noort, G. W. Canters, J. H. van der Waals (1978) Jahn-Teller instability of the first excited singlet state of zinc porphin: a study by Zeeman spectroscopy in some n-alkane host crystals at 4,2 K. *Mol. Phys.* **35**, 283–294.
- Jansen, G., M. Noort, N. van Dijk, J. H. van der Waals (1980) The orientation of porphins in n-alkane Shpolskii hosts. *Mol. Phys.* **39**, 865–880.
- Jelínek, J., Z. Málek (1982) *Kryogenní technika*, (SNTL, Praha).
- Judina, O. S., R. I. Personov (1974) Tonkostrukturnye elektronnye spektry etioporfirinov pri 4,2 K. *Biofiz.* **19**, 41–44.
- Kador, L., G. Schulte, D. Haarer (1986) Relation between hole-burning parameters and molecular parameters: Free-base phthalocyanine in polymer hosts. *J. Phys. Chem.* **90**, 1264–1270.
- Kador, L., R. I. Personov, W. Richter, T. Sesselmann, D. Haarer (1987) Laser photochemistry and hole burning spectroscopy in polymers and glasses: External field effects. *Polymer J.* **19**, 61–71.
- Kaiser, G. H., J. Beck, J. U. von Schtüz, H. C. Wolf (1981) Low temperature excitation and emission spectroscopy of the photosynthetic bacteria *Rhodopseudomonas sphaeroides* "wild type" strain ATCC 17023. *Biochim. Biophys. Acta* **634**, 153–164.
- Kaplanová, M., J. Nauš, K. Vacek (1982) *Fyzikální základy fotosyntézy*. (Univerzita Karlova, Praha).
- Kharlamov, B. M., L. A. Bykovskaya, R. I. Personov (1977) "Hole-burning spectra". A new method for obtaining fine structure in absorption spectra of organic molecules. *Chem. Phys. Lett.* **50**, 407–411.
- Kharlamov, B. M., L. A. Bykovskaya, R. I. Personov (1978) Novyj metod vyjavlenija liněčatoj struktury v neodnorodno uširenných spektrach poglošenija organičeskikh molekul. *Zh. Priklad. Spectrosk.* **28**, 839–844.
- Kharlamov, B. M., E. I. Alshits, R. I. Personov (1984) Vyžiganije provalov i transformacija širokych konturov polos poglošenija molekul v rastvorach. *Izv. Akad. Nauk SSSR* **48**, 1313–1321.
- Kharlamov, B. M., N. I. Ulickii (1987) Analiz formy provalov v spektrach poglošenija složnych molekul v izotropnych sredach vo vněšnich električeskikh i magnitnych poljach. preprint No. 12.
- Kielman-van Luijt, E. C. M., H. P. J. M. Dekkers, G. W. Canters (1976) MCD of transitions to Jahn-Teller unstable states in the metalloporphins of Mg, Zn, Cu, Pd and Pt. *Mol. Phys.* **32**, 899–919.
- Kielman-van Luijt, E. C. M., G. W. Canters (1978) Vibronic coupling and a magnetic-field-induced avoided crossing in the  $S_1 \leftarrow S_0$  absorption spectrum of palladiumporphin. *Mol. Phys.* **36**, 401–412.
- Kielman-van Luijt, E. C. M., G. W. Canters (1979) Linear polarization studies of the high-resolution absorption spectrum of palladiumporphin. *J. Mol. Spectrosc.* **78**, 469–485.
- Kikas, J. V., R. K. Kaarli, L. A. Rebane (1984) O predělnom čísle fotochimičeskich provalov v neodnorodno uširennom spektre. *Opt. Spektrosk.* **56**, 387–389.
- Kim, B. F., J. Bohandy (1978) Site selective optical spectra of free base porphin in anthracene. *J. Mol. Spectrosc.* **73**, 332–343.
- Koehler, T. R. (1980) Monte Carlo studies of porphyrin in the Shpolskii matrix n-octane. *J. Chem. Phys.* **72**, 3389–3395.
- Kooter, J. A., J. H. van der Waals (1979) The metastable triplet state of zinc porphin and magnesium porphin: A study by ESR in an n-octane crystal at 1,4 K. *Mol. Phys.* **37**, 997–1014.

- Kooter, J. A., G. W. Canters (1980) Zeeman and optical experiments on the lowest triplet state of palladium porphin. *Mol. Phys.* **41**, 361–375.
- Korotajev, O. N., R. I. Personov (1972) Obratimyje prevrašenija ljuminescirujuščich primesnych centrov v n-parafinovoj matrice pri lazernom oblučeniji. *Opt. Spektrosk.* **32**, 900–902.
- Korotajev, O. N., R. I. Personov (1974) Liněčatyje spektry ftalocianinov pri 4,2 K i něktryje osobennosti ich multipletnoj struktury. *Opt. Spektrosk.* **37**, 886–891.
- Korotajev, O. N., E. I. Donskoi, V. I. Glyadkovski, V. N. Kopranenkov (1984) Effekt selektivnovo prosvetlenija i dinamičeskij proval v spektrach poglošenija porfirinov. *Opt. Spektrosk.* **57**, 145–147.
- Lebeděva, V. V. (1986) Technika optičeskoj spektroskopiji. (Izdavatelstvo MGU, Moskva).
- Lee, H. W. H., A. L. Huston, M. Gehrtz, W. E. Moerner (1985) Photochemical hole-burning in a protonated phthalocyanine with GaAlAs diode lasers. *Chem. Phys. Lett.* **114**, 491–496.
- Litvin, F. F., R. I. Personov (1961) Tonkaja struktura spektrov poglošenija i fluorescenciji někotorych pigmentov pri 77 K. *Dokl. Akad. Nauk SSSR* **136**, 798–800.
- Litvin, F. F., R. I. Personov, O. N. Korotajev (1969) Tonkaja struktura elektronnych spektrov chlorofilla v kristalličeskikh rastvorach pri 4 K. *Dokl. Akad. Nauk SSSR* **188**, 1169–1172.
- Macfarlane, R. M., R. M. Shelby (1987) Homogeneous line broadening of optical transitions of ions and molecules in glasses. *J. Luminesc.* **36**, 179–207.
- Maslov, V. G. (1977) „Vyžiganije provalov“ v spektrach poglošenija rastvorov fotočuvstvitelných komplexov porfirinov s piridin-ionami pri 4,2 K. *Opt. Spektrosk.* **43**, 388–389.
- Maslov, V. G. (1979) Primeněnie spektroskopiji vyžiganija provalov dlja issledovanija foto-perenosa elektrona v reakcionnych centrach fotosistemy I chlorella. *Dokl. Akad. Nauk SSSR* **246**, 1511–1513.
- Maslov, V. G., A. S. Chunayev, V. V. Tugarinov (1980) Vyžiganije provalov v nizkotemperaturnych spektrach poglošenija šamma Chlamydomonas reinhardii, imějuščego obogašenije po P 700. *Biofiz.* **25**, 925–927.
- Maslov, V. G. (1981) Issledovaniye někotorych osobennostej vyroždennych donorno-akceptornych komplexov porfirinov metodom vyžiganija provalov. *Opt. Spektrosk.* **51**, 1009–1015.
- Maslov, V. G., A. S. Chunayev, V. V. Tugarinov (1981) Issledovaniye metodom spektroskopiji „vyžiganija provalov“ pervičnych fotoprocessov v fotosisteme 1 mutantnogo šamma Chlamydomonas reinhardii 516-3a obogašennogo reakcionnymi centrami P 700. *Mol. Biologija* **15**, 1016–1026.
- Maslov, V. G. (1982) Primeněnie spektroskopiji vyžiganija provalov dlja issledovanija pervičnych processov fotosintéza. *Izv. Akad. Nauk ESSR* **31**, 166–169.
- Maslov, V. G., A. V. Klevanik, V. A. Shuvalov (1984) O skorostjach perenosa energiji meždu pigmentami v bakterialnych reakcionnych centrach. *Biofiz.* **29**, 156–157.
- Mauring, K. K., A. Suisalu, R. A. Avarmaa (1980a) Rezonansno vyžigajemyj kvazistacionarnyj proval v spektre fluorescenciji protochlorofilla. *Izv. Akad. Nauk ESSR* **29**, 426–428.
- Mauring, K. K., A. Suisalu, R. A. Avarmaa, A. A. Krasnovskii (1980b) Fosforescencija chlorofilla i feofitina-a pri temperatuze židkogo gelija. *Dokl. Akad. nauk SSSR* **251**, 729–731.
- Mauring, K. K., R. A. Avarmaa (1982) Mechanizmy vyžiganija provalov v spektrach chlorofilla i feofitina. *Izv. Akad. Nauk ESSR* **31**, 155–160.
- Meech, S. R., A. J. Hoff, D. A. Wiersma (1985) Evidence for a very early intermediate in bacteriā photosynthesis. A photon-echo and hole-burning study of the primary donor band in Rhodopseudomonas sphaeroides. *Chem. Phys. Lett.* **121**, 287–292.
- Meyer, B. (1971) Low Temperature Spectroscopy. (Elsevier, New York).
- Michel-Beyerle, M. E., ed. (1985) Antennas and Reaction Centers of Photosynthetic Bacteria. (Springer-Verlag, Berlin–Heidelberg–New York–Tckyo).
- Moskovits, M., G. A. Ozin, eds. (1976) Cryochemistry. (J. Wiley, New York–London–Sydney–Toronto).
- Noort, M., G. Jansen, G. W. Canters, J. H. van der Waals (1976) High resolution spectra of

- palladium, platinum and copper porphins in n-octane crystals. *Spectrochim. Acta* **32A**, 1371–1375.
- Noort, H. M., B. Wirnitzer, J. Schmidt, J. H. van der Waals (1982) The phosphorescent  $^3E_u$  state of zinc porphin in n-alkane host crystals. Temperature dependence of the electron spin resonance transitions and spin-lattice relaxation in zero-field. *Mol. Phys.* **45**, 1259–1269.
- Olson, J. M., B. Ke, K. H. Thompson (1976) Exciton interaction among chlorophyll molecules in bacteriochlorophyll-a proteins and bacteriochlorophyll-a reaction center complexes from green bacteria. *Biochem. Biophys. Acta* **430**, 524–537.
- Osadko, I. S. (1983) Theory of light absorption and emission by organic impurity centers. in *Spectroscopy and Excitation Dynamics of Condensed Molecular Systems*, eds. V. M. Agranovich, R. M. Hochstrasser (North-Holland, Amsterdam–New York–Oxford) 437–514.
- Pachapill, J. (1986) Fotovyžiganje provala v spektrech poglošenija monomera i dimera etioporfirina I v organičeskich stěklach. *Izv. Akad. Nauk ESSR* **35**, 416–424.
- Parma, L., I. Pelant, J. Hála (1980) Aparatura pro nízkoteplotní laserovou luminiscenční spektroskopii. *Čs. čas. fyz.* **A30**, 134–139.
- Parma, L., J. Hála, M. Ambrož, I. Pelant (1981) Univerzální aparatura pro studium luminiscence. ve Sborníku 7. konference čs. fyziků. 13–05.
- Pelant, I., J. Hála, M. Ambrož (1984) Zdvojovač frekvence barvivového laseru pro obor vlnových délek 260–380 nm. *ZN* **188/84** MFF UK.
- Pelant, I., M. Ambrož, J. Hála (1985) Glanův polarizační hranol se vzduchovou vrstvou. *ZN* **246/85** MFF UK.
- Pelant, I., M. Ambrož, J. Hála (1986) Soleilův kompenzátor. *ZN* **262/86** MFF UK.
- Pelant, I., M. Ambrož, J. Hála (1987) Univerzální systém chlazení fotonásobičů suchým ledem ( $-78^\circ\text{C}$ ). *ZN* **298/87** MFF UK.
- Personov, R. I. (1963) Linějčatyje emissionnyje i absorbcionnyje spektry ftalocianina v zamoržených kristaličeskich rastvorach. *Opt. Spektrosk.* **15**, 61–71.
- Personov, R. I., E. I. Alshitc, L. A. Bykovskaya, B. M. Kharlamov (1973) Tonkaja struktura spektrov ljuminescenciji organičeskikh molekul pri lazernom vozbužděniji i priroda širokikh spektralnych polos tverdykh rastvorov. *Zh. Eksp. Teor. Fiz.* **65**, 1825–1836.
- Personov, R. I. (1983) Site selection spectroscopy of complex molecules in solutions and its applications. in *Spectroscopy and Excitation Dynamics of Condensed Molecular Systems*, eds. V. M. Agranovich, R. M. Hochstrasser (North-Holland, Amsterdam–New York–Oxford) 555–619.
- Personov, R. I. (1984) Selektivnaja spektroskopija složnykh molekul i jejo primeněnije. *Vestnik Akad. Nauk SSSR* **4**, 49–56.
- Platenkamp, R. J., H. J. den Blanken, A. J. Hoff (1980) Single-site absorption spectroscopy of pheophytin-a and chlorophyll-a in n-octane matrix. *Chem. Phys. Lett.* **76**, 35–41.
- Platenkamp, R. J., G. W. Canters (1981) Site-selection spectroscopy of magnesium and cadmium tetrabenzoporphines in n-octane. *J. Phys. Chem.* **85**, 56–63.
- Platenkamp, R. J. (1982) Site-selection and Zeeman spectroscopy of the  $S_1 \leftarrow S_0$  transition of magnesiumporphin in n-octane at 4,2 K. II. The magnesiumporphin-ethanol complex. *Mol. Phys.* **45**, 113–127.
- Platenkamp, R. J., M. Noort (1982) Site selection and Zeeman spectroscopy of the  $S_1 \rightarrow S_0$  transition of magnesiumporphin in n-octane at 4,2 K. I. *Mol. Phys.* **45**, 97–112.
- Rebane, K. K. (1968) Elementarnaja Teoriya Kolebatelnoj Struktury Spektrov Primesnych Centrov Krystalov. (Nauka, Moskva).
- Rebane, K. K., R. A. Avarmaa (1974) Kvazilinějčatyje spektry molekul chlorofilla v zamoržených rastvorach pri nizkikh temperaturach. v Sovremennyje Problemy Optiki i Jadernoj Fiziki, (Naukova Dumka, Kiev) 89–96.
- Rebane, K. K., R. A. Avarmaa (1981) Photochemical transformations in chlorophyll-like molecules via the hole-burning technique. *J. Photochem.* **17**, 311–317.

- Rebane, K. K., R. A. Avarmaa (1982) Sharp line vibronic spectra of chlorophyll and its derivatives in solid solutions. *Chem. Phys.* **68**, 191–200.
- Rebane, K. K., A. A. Gorokhovskii (1987) Hole-burning study of zero-phonon linewidths in organic glasses. *J. Luminesc.* **36**, 237–250.
- Reineker, P., K. Kassner (1987) Dephasing of optical impurity states in glasses: Low temperature *Izv. Akad. Nauk ESSR* in press.
- Renge, I., K. K. Mauring, R. A. Avarmaa (1984) High resolution spectra in vivo photoactive protochlorophyllide in etiolated leaves at 5 K. *Biochim. Biophys. Acta* **766**, 501–504.
- Renge, I., K. K. Mauring, P. Sarv, R. Avarmaa (1986) vibrationally resolved optical spectra of chlorophyll derivatives in different solid media. *J. Phys. Chem.* **90**, 6611–6616.
- Renge, I., K. K. Mauring, R. A. Avarmaa (1987) Site-selection optical spectra of bacterio-chlorophyll and bacteriopheophytin in frozen solutions. *J. Luminesc.* **37**, 207–214.
- Romanovskii, J. V., L. A. Bykovskaya, R. I. Personov (1981) Tonkostrukturajaja ljuninescencija etio-, kopro- i mezoporfirina pri selektivnom lazernom vozbužděniji. *Biofiz.* **26**, 621–627.
- Romanovskii, J. V. (1982) Projavlenije mežmolekuljarnych vzaimodějstvij v tonkostrukturych spektrach chlorofilla i jego analogov. *Izv. Akad. Nauk ESSR* **31**, 139–144.
- Sapozhnikov, M. N., V. I. Alekseev (1982) Structural luminescence spectra of biogenous porphyrins under selective laser excitation and dependence of this effect on excitation wavelength. *Chem. Phys. Lett.* **87**, 487–490.
- Sapozhnikov, M. N., V. I. Alekseev, N. A. Kiričenko, V. M. Shustrjakov, V. K. Podymov, L. A. Piruzjan (1982) Ljuninescencija biogennych porfirinov pri selektivnom rezonansnom lazernom vozbužděniji. *Dokl. Akad. SSSR* **262**, 90–94.
- Sapozhnikov, M. N., V. I. Alekseev (1983) Study of optical relaxation of polyatomic molecules in the condensed phase by site-selective laser spectroscopy. *Chem. Phys. Lett.* **97**, 331–336.
- Sapozhnikov, M. N., V. I. Alekseev (1984) Site-selective luminescence spectroscopy of impurity centers in solids: Model calculations and experiment. *Chem. Phys. Lett.* **107**, 265–271.
- Sapozhnikov, M. N. (1986) Selektivnaja lazernaja spektroskopija složnych molekul v něodnorodnych matricach: Modelnye rasčoty. *Dokl. Akad. Nauk SSSR* **287**, 839–844.
- Scherer, P. O. J., S. F. Fischer, J. K. H. Hörber, M. E. Michel-Beyerle, M. Michel (1985) On the temperature-dependence of the long wavelength fluorescence and absorption of Rhodopseudomonas viridis reaction centers. In *Antennas and Reaction Centers of Photosynthetic Bacteria*, ed. M. E. Michel-Beyerle (Springer-Verlag, Berlin–Heidelberg–New York–Tokyo) 131–137.
- Senoner, M., J. Hála (1984) A two beam fluorescence method for the investigation of light induced processes in photosynthetic systems. In *Proceedings of III. Symposium Optical Spectroscopy* (eds. D. Fassler, K. H. Feller, B. Wilhelm) 288–292.
- Sesselmann, T., W. Richter, D. Haarer (1987) Hole-burning experiments in doped polymers under uniaxial and hydrostatic pressure. *J. Luminesc.* **36**, 263–271.
- Sevchenko, A. N., K. N. Solovyev, S. F. Shkirman, M. V. Sarzhevskaya (1963) Kvazilinějčatyje elektronnokolebatělnyje spektry porfina i digidroporfina. *Dokl. Akad. Nauk SSSR* **153**, 1391–1394.
- Sevchenko, A. N., K. N. Solovyev, V. A. Mashenkov, S. F. Shkirman (1965a) Nizkotemperaturnyje poljarizacionnyje spektry porfina i jego proizvodnych. *Dokl. Akad. Nauk SSSR* **163**, 1367–1370.
- Sevchenko, A. N., K. N. Solovyev, S. F. Shkirman, T. F. Kačura (1965b) Kvazilinějčatyje elektronnyje spektry tetrabenzoporfina. *Dokl. Akad. Nauk SSSR* **161**, 1313–1315.
- Sevchenko, A. N., K. N. Solovyev, A. T. Gradyushko, S. F. Shkirman (1966) Kvazilinějčatyje elektronnyje spektry metalloproizvodnych tetrabenzoporfina i ftalocianina. *Dokl. Akad. Nauk SSSR* **169**, 77–80.
- Shelby, R. M., R. M. Macfarlane (1979) Population hole-burning using a triplet reservoir:  $S_1 \leftarrow S_0$  transition of zinc porphin in n-octane. *Chem. Phys. Lett.* **64**, 545–549.
- Shkirman, S. F., K. N. Solovyev, S. M. Arabei, G. D. Egorova (1978) Anizotropija izlučenija

- i poglošenija sveta molekulami porfina i chlorina v matricach Špoleskogo. Izv. Akad. Nauk SSSR 42, 658–663.
- Shkirman, S. F., S. M. Arabei, G. D. Egorova (1979) Fotoinducirovannyje prevrašenija molekul tetrapropilchlorina v matrice n-oktana. Zh. Priklad. Spektrosk. 31, 817–821.
- Shkirman, S. F., S. M. Arabei (1980) Spektroskopičeskie issledovaniya orientaciji molekul porfirinov v monokristalle n-oktana. Zh. Priklad. Spektrosk. 32, 793–798.
- Špolskii, E. V. (1960) Linějnyje spektry fluorescenciji organičeskikh sojedinenij i ich primeněnije. Usp. Fiz. Nauk 71, 215–242.
- Silbey, R., K. Kassner (1987) Theoretical studies of homogeneous linewidths of optical transitions in glasses. J. Luminesc. 36, 283–292.
- Skinner, A. R., D. W. Chandler (1980) Spectroscopy with supersonic jets. Am. J. Phys. 48, 8–13.
- Smith, K. M., ed. (1975) Porphyrins and Metaloporphyrins. (Elsevier, Amsterdam–Oxford–New York.)
- Solovyev, K. N., S. F. Shkirman, G. A. Zagusta (1971) Vlijanje alkilnych zamestitelj na kvazi-linějčatyje spektry porfirinov. Zh. Priklad. Spektrosk. 14, 1055–1062.
- Solovyev, K. N., I. E. Zalesskii, V. N. Kotlo, S. F. Shkirman (1973) Fotoinducirovannyje vzaimo-prevrašenija centrov otvetstvennych za „multipletnost“ v effekte Špoleskogo. Pisma v Zh. Eksp. Teor. Fiz. 17, 163–166.
- Solovyev, K. N., I. V. Stanishevskii, A. S. Starukhin, A. M. Shulga (1983) Nizkotemperaturnaja fluorescencija proizvodnych porfina pri selektivnom lazernom vozbužděniji. Izv. Akad. Nauk SSSR 47, 1399–1404.
- Solovyev, K. N., I. V. Stanishevskii, A. S. Starukhin, A. M. Shulga, G. D. Egorova (1984) Poljarizacija bezfononnych linij v spektrach fluorescenciji metallokopleksov porfina pri 4,2 K i selektivnom lazernom vozbužděniji. Zh. Priklad. Spektrosk. 40, 765–773.
- Solovyev, K. N., L. L. Gladkov, A. S. Starukhin, S. F. Shkirman (1985) Spektroskopija Porfirinov: Kolebatělnyje Sostojanija. (Nauka i Technika, Minsk)
- Starukhin, A. S., K. N. Solovyev, I. V. Stanishevskii, A. M. Shulga (1982) Tonkostrukturyje spektry fluorescenciji metallokopleksov porfina pri selektivnom lazernom vozbužděniji i 4,2 K. Izv. Akad. Nauk ESSR 31, 145–149.
- Starukhin, A. S., A. M. Shulga, I. V. Stanishevskii (1985) Metod polučenija tonkostrukturych spektrov fluorescenciji NH-tautomerov zameščennych porfirinov v tverdyh rastvorach. Opt. Spektrosk. 58, 936–939.
- Suisalu, A. P. (1982) Primeněnije metoda FDMR dlja izučenija chlorofilopodobnyh molekul. Izv. Akad. Nauk ESSR 31, 150–154.
- Tamkivi, R. (1982a) Issledovaniye gomoperenosu energiji s pomoščju spektralno selektivnoj kinetiki nizkotemperaturnoj fluorescenciji chlorofilov. Izv. Akad. Nauk ESSR 31, 187–191.
- Tamkivi, R. (1982b) Gorjačaja ljuminiscencija feofitina. Izv. Akad. Nauk ESSR 31, 447–450.
- Tamkivi, R., I. Renge, R. A. Avarmaa (1983) Fine-structured spectra of tetraphenylporphin in crystalline nitrobenzene at 5 K. Chem. Phys. Lett. 103, 103–108.
- Tamkivi, R. (1985) On the origin of short-wavelength emission in the spectra of chlorophyll-a: The 625 nm band. Chem. Phys. Lett. 118, 512–515.
- Thijssen, H. P. H. a S. Völker (1981) High-resolution spectroscopy of bacteriochlorin in n-alkane host crystals at 4,2 K. Chem. Phys. Lett. 82, 478–486.
- Thijssen, H. P. H., A. I. M. Dicker, S. Völker (1982) Optical dephasing in free-base porphin in organic glasses: A study by photochemical hole-burning. Chem. Phys. Lett. 92, 7–12.
- Thijssen, H. P. H., R. van den Berg, S. Völker (1983a) Thermal broadening of optical homogeneous linewidths in organic glasses and polymers studied via photochemical hole-burning. Chem. Phys. Lett. 97, 295–302.
- Thijssen, H. P. H. S. Völker, M. Schmidt, H. Port (1983b) Optical homogeneous linewidths in organic glasses below 1 K: A hole-burning study of free-base porphin in 2-methyltetrahydrofuran. Chem. Phys. Lett. 94, 537–539.

- Thijssen, H. P. H., R. van den Berg, S. Völker (1983c) Photochemical hole-burning down to 0,3 K in organic amorphous systems. *Chem. Phys. Lett.* **103**, 23–28.
- Thijssen, H. P. H., R. van den Berg, S. Völker (1984) Optical dephasing of impurities in amorphous organic solids down to 0,3 K. *J. Luminesc.* **31/32**, 771–773.
- Thijssen, H. P. H., S. Völker (1985) Pitfalls in the determination of optical homogeneous linewidths in amorphous systems by hole-burning. Influence of the structure of the host. *Chem. Phys. Lett.* **120**, 496–502.
- Thijssen, H. P. H., R. van den Berg, S. Völker (1985) Optical relaxation in organic disordered systems submitted to photochemical and non-photochemical hole-burning. *Chem. Phys. Lett.* **120**, 503–508.
- Urbanová, M., J. Nauš, J. Hála, L. Parma (1984) Effect of reabsorption on the fluorescence spectra of chlorophyll-a. *Collection Czechoslovak Chem. Commun.* **49**, 474–480.
- Vacek, K., J. Nauš, M. Švábová, E. Vavřinec, M. Kaplanová, J. Hála (1976) Excitation energy transfer in chlorophyll-a molecules in model systems. In *Molecular Spectroscopy of Dense Phases*, (Elsevier, Amsterdam) 463–466.
- Vacek, K., J. Nauš, M. Švábová, E. Vavřinec, M. Kaplanová, J. Hála (1977) Fluorescence polarization spectra of chlorophyll-a molecules in oriented polymer matrix. *Studia biophysica* **62**, 201–207.
- Vacek, K., J. Hála, A. Razjivin, V. Sidelnikov, M. Urbanová, P. Pančoška, A. Borisov (1984) Luminescence spectroscopy of photosynthetic models of antenna and reaction center. in *Proceedings of III. Symposium Optical Spectroscopy* eds. D. Fassler, K. H. Feller, B. Wilhelmi, 153–158.
- Vacek, K., J. Hála, A. Razjivin, V. Sidelnikov, M. Urbanová, A. Borisov, P. Pančoška (1985) Luminescence spectroscopy of photosynthetic models of antenna, reaction center and water splitting complexes. In *Conferencia Pronunciada en la Universidad Politecnica de Madrid*, 5–11.
- Vacek, K., M. Ambrož, O. Bílek, J. Hála, V. Kapsa, P. Pančoška, I. Pelant, L. Skála, L. Součková (1986) Effects of structure and geometry of pigment-protein complexes on experimental quantities in primary processes of photosynthesis. in *Progress in Photosynthesis Research I*, ed. J. Biggens Martinus Nijhoff Publishers, Dordrecht 1.3.315–318.
- Vermeglio, A., G. Paillotin (1982) Structure of Rhodopseudomonas viridis reaction centers absorption and photoselection at low temperature. *Biochim. Biophys. Acta* **681**, 32–40.
- Völker, S., J. H. van der Waals (1976) Laser-induced photochemical isomerization of free base porphyrin in an n-octane crystal at 4,2 K. *Mol. Phys.* **32**, 1703–1718.
- Völker, S., R. M. Macfarlane, A. Z. Genack, H. P. Trommsdorff, J. H. van der Waals (1977) Homogeneous linewidth of the  $S_1 \leftarrow S_0$  transition of free-base porphyrin in an n-octane crystal as studied by photochemical hole-burning. *J. Chem. Phys.* **67**, 1759–1765.
- Völker, S., R. M. Macfarlane, J. H. van der Waals (1978) Frequency shift and dephasing of the  $S_1 \leftarrow S_0$  transition of free-base porphin in an n-octane crystal as a function of temperature. *Chem. Phys. Lett.* **53**, 8–13.
- Völker, S., R. M. Macfarlane (1979a) Photochemical hole-burning in excited vibrational states of the  $S_1 \leftarrow S_0$  transition of free-base porphin in an n-octane crystal. *J. Luminesc.* **18/19** 213–214.
- Völker, S., R. M. Macfarlane (1979b) Photochemical hole-burning in vibronic bands of the  $S_1 \leftarrow S_0$  transition of free-base porphin in an n-octane crystal. *Chem. Phys. Lett.* **61**, 421–425.
- Völker, S., R. M. Macfarlane (1979c) Photochemical hole-burning in free-base porphyrin and chlorin in n-alkane matrices. *IBM J. Rec. Develop.* **23**, 547–555.
- Völker, S., R. M. Macfarlane (1980) Laser photochemistry and hole-burning of chlorin in crystalline n-alkanes at low temperatures. *J. Chem. Phys.* **73**, 4476–4482.
- Völker, S. (1987) Optical linewidths and dephasing of organic amorphous and semi-crystalline solids studied by hole burning. *J. Luminesc.* **36**, 251–262.

- de Vries, H., D. A. Wiersma (1986) Photophysical and photochemical molecular hole burning theory. *J. Chem. Phys.* 72, 1851–1863.
- Whitten, W. B., R. M. Pearlstein, J. M. Olson (1979) New spectral components in high resolution absorption spectra of green bacterial reaction center complexes at 5 K. *Photochem. Photobiol.* 29, 823–828.
- Zajdel, A. I., G. V. Ostrovskaya, J. I. Ostrovskii (1976) *Technika i Praktika Spektroskopiji*. (Nauka, Moskva).
- Zalesskii, I. E., V. N. Kotlo, K. N. Solovyev, K. N. Skhirman (1975) Fotoindukcirovannyje izmerenija kvazilinějčatych spektrov tetrabenzenoporfina. *Opt. Spektrosk.* 38, 917–924.