

# Bibliographie

- ABRAMOWITZ, M. et STEGUN, I. A. *Handbook of mathematical functions*. Dover, 1954.
- ALFVÉN, H. Magneto-hydrodynamic waves and sunspots. *Mon. Not. R. astr. Soc.*, vol. 105, p. 3–16, 1945.
- BAHNG, J. et SCHWARZSCHILD, M. Lifetime of solar granules. *Astrophys. J.*, vol. 134, p. 312, 1961.
- BALMFORTH, N. J., CUNHA, M. S., DOLEZ, N., GOUGH, D. O. et VAUCLAIR, S. On the excitation mechanism in roAp stars. *Mon. Not. R. astr. Soc.*, vol. 323, p. 362–372, 2001.
- BASU, S. et ANTIA, H. M. Seismic measurement of the depth of the solar convection zone. *Mon. Not. R. astr. Soc.*, vol. 287, p. 189–198, 1997.
- BECK, J. G. Large-scale solar velocities on time scales up to thirty days. *Ph.D. Thesis*, 1997.
- BECKERS, J. M. Photospheric brightness differences associated with the solar supergranulation. *Solar Phys.*, vol. 5, p. 309, 1968.
- BENDER, C. M. et ORZAG, S. A. *Advanced mathematical methods for scientists and engineers*. Mc Graw-Hill, 1978.
- BENZI, R., CILIBERTO, S., BAUDET, C. et CHAVARRIA, G. R. On the scaling of three-dimensional homogeneous and isotropic turbulence. *Physica D*, vol. 80, p. 385–398, 1995.
- BENZI, R., CILIBERTO, S., TRIPICCIONE, R., BAUDET, C., MASSAIOLI, F. et SUCCI, S. Extended self-similarity in turbulent flows. *Phys. Rev. D*, vol. 48, p. 29, 1993.
- BENZI, R., TOSCHI, F. et TRIPICCIONE, R. On the heat transfer in Rayleigh-Bénard systems. *J. Stat. Phys.*, vol. 93, 1998.
- BENZI, R., TRIPICCIONE, R., MASSAIOLI, F., SUCCI, S. et CILIBERTO, S. On the scaling of the velocity and temperature structure functions in Rayleigh-Bénard convection. *Europhys. Lett.*, vol. 25 (5), p. 341–346, 1994.

- BERGER, T. E., ROUPPE VAN DER VOORT, L. H. M., LOFDAHL, M. G., CARLSON, M., FOSSUM, A., HANSTEEN, V. H., MARTHINUSSEN, E., TITLE, A. M. et SCHARMER, G. Observations of solar magnetic elements with 0.1" resolution. *American Astronomical Society Meeting*, vol. 204, 2004.
- BIGOT, L. et DZIEMBOWSKI, W. A. The oblique pulsator model revisited. *Astron. & Astrophys.*, vol. 391, p. 235–245, 2002.
- BIRONT, D., GOOSENS, M., COUSENS, A. et MESTEL, L. A singular perturbation approach to the effect of a weak magnetic field on stellar oscillations. *Mon. Not. R. astr. Soc.*, vol. 201, p. 619–633, 1982.
- BOLGIANO, R. Structure of turbulence in stratified media. *J. Geophys. Res.*, vol. 67 (16), p. 3015, 1962.
- BRANDENBURG, A., STEIN, R. F. et NORDLUND, Å. Astrophysical convection *Geophysical and astrophysical convection 95.*, édité par FOX, P. A. et KERR, B., p. 85. Gordon and Breach Science Publishers, 2000.
- BRAY, R. J., LOUGHHEAD, R. E. et DURRANT, C. J. *The solar granulation (2nd edition)*. Cambridge and New York, Cambridge University Press, 1984.
- BRUMMELL, N. H., CLUNE, T. L. et TOOMRE, J. Penetration and overshooting in turbulent compressible convection. *Astrophys. J.*, vol. 570, p. 825–854, 2002.
- BRUMMELL, N. H., HURLBURT, N. E. et TOOMRE, J. Turbulent compressible convection with rotation. I. flow structure and evolution. *Astrophys. J.*, vol. 473, p. 494, 1996.
- BRUMMELL, N. H., HURLBURT, N. E. et TOOMRE, J. Turbulent compressible convection with rotation. II. Mean flows and differential rotation. *Astrophys. J.*, vol. 493, p. 955, 1998.
- BUSSE, F. H. et RIAHI, N. Nonlinear convection in a layer with nearly insulating boundaries. *J. Fluid Mech.*, vol. 96, p. 243–256, 1980.
- CALIFANO, F. A numerical algorithm for geophysical and astrophysical inhomogeneous fluid flows. *Comp. Phys. Comm.*, vol. 99, p. 29, 1996.
- CALZAVARINI, E., TOSCHI, F. et TRIPICCIONE, R. Evidences of Bolgiano scaling in 3D Rayleigh-Benard convection. *Phys. Rev. D*, vol. 66, p. 016304, 2002.
- CAMPBELL, C. G. et PAPALOIZOU, J. C. B. Stellar oscillations in the presence of a magnetic field. *Mon. Not. R. astr. Soc.*, vol. 220, p. 577–591, 1986.
- CANUTO, C., HUSSAINI, M. Y., QUARTERONI, A. et ZANG, T. A. *Spectral methods in fluid dynamics*. Springer-Verlag, 1988.
- CARPENTER, M., GOTTLIEB, D. et ABARBANEL, S. The stability of numerical boundary treatments for compact high-order finite-difference schemes. *J. Comp. Phys.*, vol. 108, p. 272–295, 1993.
- CATTANEO, F. On the effects of a weak magnetic field on turbulent transport. *Astrophys. J.*, vol. 434, p. 200–205, 1994.

- CATTANEO, F. On the origin of magnetic fields in the quiet photosphere. *Astrophys. J.*, vol. 515, p. L39–L42, 1999.
- CATTANEO, F., BRUMMELL, N. H., TOOMRE, J., MALAGOLI, A. et HURLBURT, N. E. Turbulent compressible convection. *Astrophys. J.*, vol. 370, p. 282–294, 1991.
- CATTANEO, F., EMONET, T. et WEISS, N. On the interaction between convection and magnetic fields. *Astrophys. J.*, vol. 588, p. 1183–1198, 2003.
- CATTANEO, F., HURLBURT, N. E. et TOOMRE, J. Supersonic convection. *Astrophys. J.*, vol. 349, p. L63–L66, 1990.
- CATTANEO, F., LENZ, D. et WEISS, N. On the origin of the solar mesogranulation. *Astrophys. J.*, vol. 563, p. L91–L94, 2001.
- CATTANEO, F. et VAINSHTEIN, S. I. Suppression of turbulent transport by a weak magnetic field. *Astrophys. J.*, vol. 376, p. L21–L24, 1991.
- CELLIERS, P. M., COLLINS, G. W., DA SILVA, L. B., GOLD, D. M., CAUBLE, R., WALLACE, R. J., FOORD, M. E. et HAMMEL, B. A. Shock-induced transformation of liquid deuterium into a metallic fluid. *Phys. Rev. Letters*, vol. 84, p. 5564–5567, 2000.
- CHAN, K. L. et SOFIA, S. Turbulent compressible convection in a deep atmosphere. III - Tests on the validity and limitation of the numerical approach. *Astrophys. J.*, vol. 307, p. 222–241, 1986.
- CHAN, K. L. et SOFIA, S. Turbulent compressible convection in a deep atmosphere. IV - Results of three-dimensional computations. *Astrophys. J.*, vol. 336, p. 1022–1040, 1989.
- CHAN, K. L. et SOFIA, S. Turbulent compressible convection in a deep atmosphere. V. Higher order statistical moments for a deeper case. *Astrophys. J.*, vol. 466, p. 372, 1996.
- CHAN, K. L., SOFIA, S. et WOLFF, C. L. Turbulent compressible convection in a deep atmosphere. I - Preliminary two-dimensional results. *Astrophys. J.*, vol. 263, p. 935–943, 1982.
- CHANDRASEKHAR, S. *Hydrodynamic and hydromagnetic stability*. Dover, 1961.
- CHAPMAN, C. J. et PROCTOR, M. R. E. Nonlinear Rayleigh-Benard convection between poorly conducting boundaries. *J. Fluid Mech.*, vol. 101, p. 759–782, 1980.
- CHATELIN, F. *Eigenvalues of matrices*. John Wiley, 1993.
- CHEVALIER, S. Contribution to the study of the photosphere. *Astrophys. J.*, vol. 27, p. 12, 1908.
- CHILLÁ, F., CILIBERTO, S., INNOCENTI, C. et PAMPALONI, E. Boundary layer and scaling properties in turbulent thermal convection. *Nuovo Cimento*, vol. 15D (9), p. 1229, 1993.
- CHOU, D.-Y., CHEN, C.-S., OU, K.-T. et WANG, C.-C. Power spectra of median- and small-scale solar convection. *Astrophys. J.*, vol. 396, p. 333–339, 1992.

- CHOU, D.-Y., LABONTE, B. J., BRAUN, D. C. et DUVALL, T. L. Power spectra of solar convection. *Astrophys. J.*, vol. 372, p. 314–320, 1991.
- CHRISTENSEN-DALSGAARD, J., GOUGH, D. O. et THOMPSON, M. J. The depth of the solar convection zone. *Astrophys. J.*, vol. 378, p. 413–437, 1991.
- CIONI, S., CILIBERTO, S. et SOMMERIA, J. Temperature structure functions in turbulent convection at low Prandtl number. *Europhys. Lett.*, vol. 32 (5), p. 413–418, 1995.
- CLARK, A. J. et JOHNSON, H. K. Magnetic field accumulation in supergranules. *Solar Phys.*, vol. 2, p. 433–440, 1967.
- CLUNE, T. C., ELLIOTT, J. R., MIESCH, M. S. et TOOMRE, J. Computational aspects of a code to study rotating turbulent convection in spherical shells. *Parallel Computing*, 1999.
- COULLET, P. et FAUVE, S. Propagative phase dynamics for systems with Galilean invariance. *Phys. Rev. Letters*, vol. 55, p. 2857–2859, 1985.
- CROSS, M. C. et HOHENBERG, P. C. Pattern formation outside of equilibrium. *Rev. Mod. Phys.*, vol. 65, p. 851–1112, 1993.
- CROSS, M. C. et NEWELL, A. C. Convection patterns in large aspect ratio systems. *Physica D*, vol. 10, p. 299–328, 1984.
- DEMUREN, A. O., WILSON, R. V. et CARPENTER, M. Higher-order compact schemes for numerical simulation of incompressible flows, Part I : theoretical development. *Numerical Heat Transfer*, vol. 39, p. 207–230, 2001.
- DEPASSIER, M. C. et SPIEGEL, E. A. The large-scale structure of compressible convection. *Astron. J.*, vol. 86, p. 496–512, 1981.
- DEROSA, M. Dynamics in the upper solar convection zone. *Ph.D. Thesis*, 2001.
- DEROSA, M., DUVALL, T. L. et TOOMRE, J. Near-surface flow fields deduced using correlation tracking and time-distance analyses. *Solar Phys.*, vol. 192, p. 351–361, 2000.
- DEROSA, M. L., GILMAN, P. A. et TOOMRE, J. Solar multiscale convection and rotation gradients studied in shallow spherical shells. *Astrophys. J.*, vol. 581, p. 1356–1374, 2002.
- DESLANDRES, H. C.R., vol. 129, p. 1225, 1899.
- DOMÍNGUEZ CERDEÑA, I. Evidence of mesogranulation from magnetograms of the Sun. *Astron. & Astrophys.*, vol. 412, p. L65–L68, 2003.
- DUBRULLE, B. et FRISCH, U. Eddy viscosity of parity-invariant flow. *Phys. Rev. A*, vol. 43, p. 5355–5364, 1991.
- DUVALL, T. L. et GIZON, L. Time-distance helioseismology with f Modes as a method for measurement of near-surface flows. *Solar Phys.*, vol. 192, p. 177–191, 2000.

- DUVALL, T. L., KOSOVICHEV, A. G., SCHERRER, P. H., BOGART, R. S., BUSH, R. I., DE FOREST, C., HOEKSEMA, J. T., SCHOU, J., SABA, J. L. R., TARBELL, T. D., TITLE, A. M., WOLFSON, C. J. et MILFORD, P. N. Time-distance helioseismology with the MDI instrument : initial results. *Solar Phys.*, vol. 170, p. 63–73, 1997.
- DZIEMBOWSKI, W. A. et GOODE, P. R. Magnetic effects on oscillations in roAp stars. *Astrophys. J.*, vol. 458, p. 338–346, 1996.
- EDWARDS, J. M. On the influence of the thermal and magnetic boundary conditions on the linear theory of magnetoconvection. *Geophys. Astrophys. Fluid Dyn.*, vol. 55, p. 1–17, 1990.
- ELLIOTT, J. R. Three-dimensional numerical simulations of compressible solar convection in cartesian geometry. *Astrophys. J.*, vol. 539, p. 469–479, 2000.
- EMONET, T. et CATTANEO, F. Small-scale photospheric fields : observational evidence and numerical simulations. *Astrophys. J.*, vol. 560, p. L197–L200, 2001.
- FRAZIER, E. N. Multi-channel magnetograph observations. II. Supergranulation. *Solar Phys.*, vol. 14, p. 89, 1970.
- FRISCH, U. *Turbulence : the legacy of A. N. Kolmogorov*. Cambridge University Press, 1995.
- FRISCH, U., SHE, Z. S. et SULEM, P. L. Large-scale flow driven by the anisotropic kinetic alpha effect. *Physica D*, vol. 28, p. 382–392, 1987.
- GAMA, S., VERGASSOLA, M. et FRISCH, U. Negative eddy viscosity in isotropically forced two-dimensional flow : linear and non-linear dynamics. *J. Fluid Mech.*, vol. 260, p. 95, 1994.
- GILMAN, P. A. Linear simulations of Boussinesq convection in a deep rotating spherical shell. *J. Atm. Sc.*, vol. 32, p. 1331–1352, 1975.
- GILMAN, P. A. et GLATZMAIER, G. A. Compressible convection in a rotating spherical shell. I - Anelastic equations. II - A linear anelastic model. III - Analytic model for compressible vorticity waves. *Astrophys. J. Supp. Ser.*, vol. 45, p. 335–388, 1981.
- GIZON, L., DUVALL, T. L. et SCHOU, J. Wave-like properties of solar supergranulation. *Nature*, vol. 421, p. 43–44, 2003.
- GLATZMAIER, G. A. Numerical simulations of stellar convective dynamos. I - The model and method. *J. Comp. Phys.*, vol. 55, p. 461–484, 1984.
- GOOSSENS, M., ANDRIES, J. et ASCHWANDEN, M. J. Coronal loop oscillations. An interpretation in terms of resonant absorption of quasi-mode kink oscillations. *Astron. & Astrophys.*, vol. 394, p. L39–L42, 2002.
- GOUGH, D. O., MOORE, D. R., SPIEGEL, E. A. et WEISS, N. O. Convective instability in a compressible atmosphere. II. *Astrophys. J.*, vol. 206, p. 536–542, 1976.
- GRAHAM, E. Numerical simulation of two-dimensional compressible convection. *J. Fluid Mech.*, vol. 70, p. 689–703, 1975.

GRAHAM, E. et MOORE, D. R. The onset of compressible convection. *Mon. Not. R. astr. Soc.*, vol. 183, p. 617–632, 1978.

HAGENAAR, H. J., SCHRIJVER, C. J. et TITLE, A. M. The distribution of cell sizes of the solar chromospheric network. *Astrophys. J.*, vol. 481, p. 988, 1997.

HANSEN, H., LOUAPRE, D., ANTCZAK, S., MOYEN, J. Y. et D'AUTRES. De l'importance des traditions. Non publié, Lyon, 1999.

HART, A. B. Motions in the Sun at the photospheric level. IV. The equatorial rotation and possible velocity fields in the photosphere. *Mon. Not. R. astr. Soc.*, vol. 114, p. 17, 1954.

HART, A. B. Motions in the Sun at the photospheric level. VI. Large-scale motions in the equatorial region. *Mon. Not. R. astr. Soc.*, vol. 116, p. 38, 1956.

HATHAWAY, D. H., BECK, J. G., BOGART, R. S., BACHMANN, K. T., KHATRI, G., BETITTO, J. M., HAN, S. et RAYMOND, J. The photospheric convection spectrum. *Solar Phys.*, 2000.

HATHAWAY, D. H., BECK, J. G., HAN, S. et RAYMOND, J. Radial flows in supergranules. *Solar Phys.*, vol. 205, p. 25–38, 2002.

HERSCHEL, W. Observations tending to investigate the nature of the Sun, in order to find the causes or symptoms of its variable emission of light and heat; with remarks on the use that may possibly be drawn from solar observations. *Phil. Trans. R. Soc. Lond.*, vol. 91, 1801.

HESLOT, F., CASTAING, B. et LIBCHABER, A. Transitions to turbulence in helium gas. *Phys. Rev. A*, vol. 36, p. 5870–5873, 1987.

HURLBURT, N. E., PROCTOR, M. R. E., WEISS, N. O. et BROWNJOHN, D. P. Nonlinear compressible magnetoconvection. I - Travelling waves and oscillations. *J. Fluid Mech.*, vol. 207, p. 587–628, 1989.

HURLBURT, N. E. et TOOMRE, J. Magnetic fields interacting with nonlinear compressible convection. *Astrophys. J.*, vol. 327, p. 920–932, 1988.

HURLBURT, N. E., TOOMRE, J. et MASSAGUER, J. M. Two-dimensional compressible convection extending over multiple scale heights. *Astrophys. J.*, vol. 282, p. 557–573, 1984.

HURLE, D., JAKEMAN, E. et PIKE, E. On the solution of the Benard problem with boundaries of finite conductivity. *Proc. R.Soc. Lond. A*, p. 469–475, 1966.

JANSSEN, J. *Ann. Obs. Astron. Paris Meudon*, vol. 1, 1896.

KELLER, C. U., DEUBNER, F.-L., EGGER, U., FLECK, B. et POVEL, H. P. On the strength of solar intra-network fields. *Astron. & Astrophys.*, vol. 286, p. 626–634, 1994.

KERNER, W., LERBINGER, K. et RIEDEL, K. Resistive Alfvén spectrum of tokamaklike configurations in straight cylindrical geometry. *Phys. Fluids*, vol. 29, p. 2975–2987, 1986.

- KIPPENHAHN, R. et WEIGERT, A. *Stellar structure and evolution*. Springer-Verlag Berlin Heidelberg New York. Also Astronomy and Astrophysics Library, 1994.
- KITCHATINOV, L. L., RÜDIGER, G. et KHOMENKO, G. Large-scale vortices in rotating stratified disks. *Astron. & Astrophys.*, vol. 287, p. 320–324, 1994.
- KOSOVICHEV, A. G., SCHOU, J., SCHERRER, P. H., BOGART, R. S., BUSH, R. I., HOEKSEMA, J. T., ALOISE, J., BACON, L., BURNETTE, A., DE FOREST, C., GILES, P. M., LEIBRAND, K., NIGAM, R., RUBIN, M., SCOTT, K., WILLIAMS, S. D., BASU, S., CHRISTENSEN-DALSGAARD, J., DAPPEN, W., RHODES, E. J., DUVAL, T. L., HOWE, R., THOMPSON, M. J., GOUGH, D. O., SEKII, T., TOOMRE, J., TARBELL, T. D., TITLE, A. M., MATHUR, D., MORRISON, M., SABA, J. L. R., WOLFSON, C. J., ZAYER, I. et MILFORD, P. N. Structure and rotation of the solar interior : initial results from the MDI medium-l program. *Solar Phys.*, vol. 170, p. 43–61, 1997.
- KRAUSE, F. et RÜDIGER, G. On the Reynolds stresses in mean field hydrodynamics. I. Incompressible homogeneous isotropic turbulence. *Astron. Nachr.*, vol. 295, p. 93–99, 1974.
- KRIJGER, J. M. et ROUDIER, T. Photospheric flows measured with TRACE II. Network formation. *Astron. & Astrophys.*, vol. 403, p. 715–723, 2003.
- KURTZ, D. W. Rapidly oscillating Ap stars. *Ann. Rev. Astron. Astrophys.*, vol. 28, p. 607–655, 1990.
- LAMB, H. *Hydrodynamics*. Dover, 1932.
- LANDAU, L. D. et LIFSHITZ, E. M. *Mécanique des fluides*. Éditions Mir Moscou, 1971.
- LAWRENCE, J. K., CADAVID, A. C. et RUZMAIKIN, A. Mesogranulation and turbulence in photospheric flows. *Solar Phys.*, vol. 202, p. 27–39, 2001.
- LEIGHTON, R. B. The solar granulation. *Ann. Rev. Astron. Astrophys.*, vol. 1, p. 19–40, 1963.
- LEIGHTON, R. B., NOYES, R. W. et SIMON, G. W. Velocity fields in the solar atmosphere. I. Preliminary report. *Astrophys. J.*, vol. 135, p. 474, 1962.
- LELE, S. K. Compact finite difference schemes with spectral-like resolution. *J. Comp. Phys.*, vol. 103(1), p. 16–42, 1992.
- Astrophysical fluid dynamics*, 1993. Les Houches 1987, North Holland Publishing.
- LIGNIÈRES, F. Rapport d'activité IDRIS, 1999.
- LIGNIÈRES, F. Rapport d'activité IDRIS, 2002.
- LIGNIÈRES, F., CALIFANO, F. et MANGENEY, A. Stress-driven mixed layer in a stably stratified fluid. *Geophys. Astrophys. Fluid Dyn.*, vol. 88, p. 81–113, 1998.
- LIN, H. On the distribution of the solar magnetic fields. *Astrophys. J.*, vol. 446, p. 421, 1995.
- LIN, H. et KUHN, J. R. Precision IR and visible solar photometry. *Solar Phys.*, vol. 141, p. 1–26, 1992.

- LISLE, J., DEROSA, M. et TOOMRE, J. New approach to study extended evolution of supergranular flows and their advection of magnetic elements. *Solar Phys.*, vol. 197, p. 21–30, 2000.
- LIVINGSTON, W. C. et HARVEY, J. A new component of solar magnetism - The inner network fields. *Bull. Am. Astron. Soc.*, vol. 7, p. 346, 1975.
- LOU, Y. Possible oscillation modes of magnetic white dwarfs. *Mon. Not. R. astr. Soc.*, vol. 275, p. L11–L15, 1995.
- LOWE, M. et GOLLUB, J. P. Pattern selection near the onset of convection : The Eckhaus instability. *Phys. Rev. Letters*, vol. 55, p. 2575–2578, 1985.
- L'VOV, V. S. Spectra of velocity and temperature fluctuations with constant entropy flux of fully developed free-convective turbulence. *Phys. Rev. Letters*, vol. 67, p. 687–690, 1991.
- MALAGOLI, A., CATTANEO, F. et BRUMMELL, N. H. Turbulent supersonic convection in three dimensions. *Astrophys. J.*, vol. 361, p. L33–L36, 1990.
- MARTIN, S. F. The identification and interaction of network, intranetwork, and ephemeral-region magnetic fields. *Solar Phys.*, vol. 117, p. 243–259, 1988.
- MASSAGUER, J. M. et ZAHN, J.-P. Cellular convection in a stratified atmosphere. *Astron. & Astrophys.*, vol. 87, p. 315–327, 1980.
- MATTHEWS, P. C., HURLBURT, N. E., PROCTOR, M. R. E. et BROWNJOHN, D. P. Compressible magnetoconvection in oblique fields - Linearized theory and simple nonlinear models. *J. Fluid Mech.*, vol. 240, p. 559–569, 1992.
- MATTHEWS, P. C., PROCTOR, M. R. E. et WEISS, N. O. Compressible magnetoconvection in three dimensions : planforms and nonlinear behaviour. *J. Fluid Mech.*, vol. 305, p. 281–305, 1995.
- MESHALKIN, L. D. et SINAI, I. Investigation of the stability of a stationary solution of a system of equations for the plane movement of an incompressible viscous fluid. *Prikl. Math. Mekh.*, vol. 25 (6), p. 1140–1143, 1961.
- MOFFATT, H. K. *Magnetic field generation in electrically conducting fluids*. Cambridge, England, Cambridge University Press, 1978.
- MOFFATT, H. K., KIDA, S. et OHKITANI, K. Stretched vortices - the sinews of turbulence ; large-reynolds-number asymptotics. *J. Fluid Mech.*, vol. 259, p. 241, 1994.
- MONIN, A. S. et YAGLOM, A. M. *Statistical fluid mechanics : mechanics of turbulence*. MIT Press, 1971.
- MULLER, R., AUFFRET, H., ROUDIER, T., VIGNEAU, J., SIMON, G. W., FRANK, Z., SHINE, R. A. et TITLE, A. M. Evolution and advection of solar mesogranulation. *Nature*, vol. 356, p. 322–325, 1992.
- MURPHY, J. O. The effect of a magnetic Field on the onset of thermal convection when constant flux boundary conditions apply. *Proceedings of the Astronomical Society of Australia*, vol. 3, p. 164, 1977.



- NEWELL, A. C., PASSOT, T. et SOULI, M. The phase diffusion and mean drift equations for convection at finite rayleigh numbers in large containers. *J. Fluid Mech.*, vol. 220, p. 187–252, 1990.
- NORDLUND, Å. Numerical simulations of the solar granulation. I - Basic equations and methods. *Astron. & Astrophys.*, vol. 107, p. 1–10, 1982.
- NORDLUND, Å., GALSGAARD, K. et STEIN, R. F. Magnetoconvection and magnetoturbulence *Solar surface magnetic fields.*, édité par RUTTEN, R. J. et SCHRIJVER, C. J., volume 433, p. 471, NATO ASI Series, 1994.
- NORDLUND, Å., SPRUIT, H. C., LUDWIG, H.-G. et TRAMPEDACH, R. Is stellar granulation turbulence? *Astron. & Astrophys.*, vol. 328, p. 229–234, 1997.
- NOVEMBER, L. J. Measurement of geometric distortion in a turbulent atmosphere. *Appl. Optics*, vol. 25, p. 392–397, 1986.
- NOVEMBER, L. J. Inferring the depth extent of the horizontal supergranular flow. *Solar Phys.*, vol. 154, p. 1–17, 1994.
- NOVEMBER, L. J. et SIMON, G. W. Precise proper-motion measurement of solar granulation. *Astrophys. J.*, vol. 333, p. 427–442, 1988.
- NOVEMBER, L. J., TOOMRE, J., GEBBIE, K. B. et SIMON, G. W. The detection of mesogranulation on the sun. *Astrophys. J.*, vol. 245, p. L123–L126, 1981.
- OBOUKHOV, A. M. *Dokl. Akad. Nauk. SSR*, vol. 125, 1959.
- ODA, N. Morphological study of the solar granulation. III - The mesogranulation. *Solar Phys.*, vol. 93, p. 243–255, 1984.
- PARKER, E. N. Hydromagnetic dynamo models. *Astrophys. J.*, vol. 122, p. 293, 1955.
- PASSOT, T. et POUQUET, A. Numerical simulation of compressible homogeneous flows in the turbulent regime. *J. Fluid Mech.*, vol. 181, p. 441–466, 1987.
- PIRRAGLIA, J. A. Meridional energy balance of Jupiter. *Icarus*, vol. 59, p. 169–176, 1984.
- PLONER, S. R. O., SOLANKI, S. K. et GADUN, A. S. Is solar mesogranulation a surface phenomenon? *Astron. & Astrophys.*, vol. 356, p. 1050–1054, 2000.
- POMEAU, Y. et MANNEVILLE, P. Stability and fluctuations of a spatially periodic convection. *J. Phys. (Paris) Lettres*, vol. 40, p. 609, 1979.
- PORTER, D. H. et WOODWARD, P. R. High-resolution simulations of compressible convection using the piecewise-parabolic method. *Astrophys. J.*, vol. 93, p. 309–349, 1994.
- POTHÉRAT, A., SOMMERIA, J. et MOREAU, R. Effective boundary conditions for magnetohydrodynamic flows with thin Hartmann layers. *Phys. Fluids*, vol. 14, p. 403–410, 2002.
- PROCACCIA, I. et ZEITAK, R. Scaling exponents in thermally driven turbulence. *Phys. Rev. A*, vol. 42, p. 821–830, 1990.

- RÄDLER, K.-H. et NESS, N. F. The symmetry properties of planetary magnetic fields. *J. Geophys. Res.*, vol. 95 (14), p. 2311–2318, 1990.
- RAST, M. P. Supergranulation : new observation, possible explanation. *ESA SP-517 : GONG+ 2002. Local and global helioseismology : the present and future*, p. 163, 2003a.
- RAST, M. P. The scales of granulation, mesogranulation, and supergranulation. *Astrophys. J.*, vol. 597, p. 1200–1210, 2003b.
- RAST, M. P., LISLE, J. P. et TOOMRE, J. The spectrum of the solar supergranulation : multiple bonwave components. *Astrophys. J.*, vol. 608, p. 1156–1166, 2004.
- RAST, M. P., NORDLUND, Å., STEIN, R. F. et TOOMRE, J. Ionization effects in three-dimensional solar granulation simulations. *Astrophys. J.*, vol. 408, p. L53–L56, 1993.
- RAST, M. P. et TOOMRE, J. Compressible convection with ionization. I. Stability, flow Asymmetries, and energy transport. *Astrophys. J.*, vol. 419, p. 224, 1993.
- REESE, D., RINCON, F. et RIEUTORD, M. Oscillations of magnetic stars : II. Axisymmetric toroidal and non-axisymmetric shear Alfvén modes in a spherical shell. *Astron. & Astrophys.*, vol. 427, p. 279–292, 2004.
- RIEUTORD, M. Linear theory of rotating fluids using spherical harmonics. i. Steady flows. *Geophys. Astrophys. Fluid Dyn.*, vol. 39, p. 163–182, 1987.
- RIEUTORD, M. Linear theory of rotating fluids using spherical harmonics. ii. Time periodic flows. *Geophys. Astrophys. Fluid Dyn.*, vol. 59, p. 182–208, 1991.
- RIEUTORD, M. Introduction à la dynamique des fluides. Non publié. École d'été, Aussois, 2004.
- RIEUTORD, M., LUDWIG, H.-G., ROUDIER, T., NORDLUND, Å. et STEIN, R. F. A simulation of solar convection at supergranulation scale. *Nuovo Cimento*, vol. 25, p. 523, 2002.
- RIEUTORD, M., ROUDIER, T., MALHERBE, J. M. et RINCON, F. On mesogranulation, network formation and supergranulation. *Astron. & Astrophys.*, vol. 357, p. 1063–1072, 2000.
- RINCON, F. et RIEUTORD, M. Oscillations of magnetic stars : I. Axisymmetric shear Alfvén modes of a spherical shell in a dipolar magnetic field. *Astron. & Astrophys.*, vol. 398, p. 663–675, 2003.
- ROBERTS, A. J. An analysis of near-marginal, mildly penetrative convection with heat flux prescribed on the boundaries. *J. Fluid Mech.*, vol. 158, p. 71–93, 1985.
- ROBERTS, P. H. *An introduction to magnetohydrodynamics*. Longmans, 1967.
- ROBERTS, P. H. et SOWARD, A. M. The effect of a weak magnetic field on stellar oscillations. *Mon. Not. R. astr. Soc.*, vol. 205, p. 1171–1189, 1983.

- ROUDIER, T., LIGNIERES, F., RIEUTORD, M., BRANDT, P. et MALHERBE, J. Families of fragmenting granules and their relation to meso- and supergranular flow fields. *Astron. & Astrophys.*, vol. 409, p. 299–308, 2003.
- ROUDIER, T. et MULLER, R. Relation between families of granules, mesogranules and photospheric network. *Astron. & Astrophys.*, vol. 419, p. 757–762, 2004.
- ROUDIER, T., RIEUTORD, M., MALHERBE, J. M. et VIGNEAU, J. Determination of horizontal velocity fields at the sun's surface with high spatial and temporal resolution. *Astron. & Astrophys.*, vol. 349, p. 301–311, 1999.
- RUCKLIDGE, A. M., WEISS, N. O., BROWNJOHN, D. P., MATTHEWS, P. C. et PROCTOR, M. R. E. Compressible magnetoconvection in three dimensions : pattern formation in a strongly stratified layer. *J. Fluid Mech.*, vol. 419, p. 283–323, 2002.
- RÜDIGER, G. *Differential rotation and stellar convection. Sun and the solar stars.* Berlin : Akademie Verlag, 1989.
- SANO, M., ZHONG WU, X. et LIBCHABER, A. Turbulence in helium-gas free convection. *Phys. Rev. A*, vol. 40, p. 6421–6430, 1989.
- SCHERRER, P. H., BOGART, R. S., BUSH, R. I., HOEKSEMA, J. T., KOSOVICHEV, A. G., SCHOU, J., ROSENBERG, W., SPRINGER, L., TARBELL, T. D., TITLE, A., WOLFSON, C. J., ZAYER, I. et MDI ENGINEERING TEAM. The solar oscillations investigation - Michelson Doppler Imager. *Solar Phys.*, vol. 162, p. 129–188, 1995.
- SCHRIJVER, C. J., HAGENAAR, H. J. et TITLE, A. M. On the patterns of the solar granulation and supergranulation. *Astrophys. J.*, vol. 475, p. 328, 1997.
- SHINE, R. A., SIMON, G. W. et HURLBURT, N. E. Supergranule and mesogranule evolution. *Solar Phys.*, vol. 193, p. 313–331, 2000.
- SHRAIMAN, B. I. et SIGGIA, E. D. Heat transport in high-Rayleigh-number convection. *Phys. Rev. A*, vol. 42, p. 3650–3653, 1990.
- SIGGIA, E. D. High Rayleigh number convection. *Ann. Rev. Fluid Mech.*, vol. 26, p. 137–168, 1994.
- SIMON, G. W. et LEIGHTON, R. B. Velocity fields in the solar atmosphere. III. Large-scale motions, the chromospheric network, and magnetic fields. *Astrophys. J.*, vol. 140, p. 1120, 1964.
- SIMON, G. W., TITLE, A. M., TOPKA, K. P., TARBELL, T. D., SHINE, R. A., FERGUSON, S. H., ZIRIN, H. et SOUP TEAM. On the relation between photospheric flow fields and the magnetic field distribution on the solar surface. *Astrophys. J.*, vol. 327, p. 964–967, 1988.
- SIMON, G. W., TITLE, A. M. et WEISS, N. O. Modeling mesogranules and ex-ploders on the solar surface. *Astrophys. J.*, vol. 375, p. 775–788, 1991.
- SIMON, G. W. et WEISS, N. O. Simulation of large-scale flows at the solar surface. *Astrophys. J.*, vol. 345, p. 1060–1078, 1989.
- SIVASHINSKY, G. Weak turbulence in periodic flows. *Physica D*, vol. 17, p. 243–255, 1985.

- SNODGRASS, H. B. et ULRICH, R. K. Rotation of Doppler features in the solar photosphere. *Astrophys. J.*, vol. 351, p. 309–316, 1990.
- SOLANKI, S. K. Small-scale solar magnetic fields - An overview. *Space Science Reviews*, p. 1, 1993.
- SPARROW, E., GOLDSTEIN, R. et JONSSON, V. K. Thermal instability in a horizontal fluid layer : effect of boundary conditions and non-linear temperature profile. *J. Fluid Mech.*, vol. 18, p. 513–528, 1964.
- SPIEGEL, E. A. Convective instability in a compressible atmosphere. I. *Astrophys. J.*, vol. 141, p. 1068–1090, 1965.
- SPRUIT, H. C., NORDLUND, Å. et TITLE, A. M. Solar convection. *Ann. Rev. Astron. Astrophys.*, vol. 28, p. 263–301, 1990.
- STARCHENKO, S. V. et JONES, C. A. Typical velocities and magnetic field strengths in planetary interiors. *Icarus*, vol. 157, p. 426–435, 2002.
- STEIN, R. F. et NORDLUND, Å. Topology of convection beneath the solar surface. *Astrophys. J.*, vol. 342, p. L95–L98, 1989.
- STEIN, R. F. et NORDLUND, Å. Simulations of solar granulation. I. General properties. *Astrophys. J.*, vol. 499, p. 914–933, 1998.
- STEVENSON, D. J. Planetary magnetic fields. *Reports of Progress in Physics*, vol. 46, p. 555–557, 1983.
- STIX, M. *The Sun : an introduction*. 2nd ed. Berlin : Springer, 2002.
- STRAUS, T. et BONACCINI, D. Dynamics of the solar photosphere. I. Two-dimensional spectroscopy of mesoscale phenomena. *Astron. & Astrophys.*, vol. 324, p. 704–712, 1997.
- SULEM, P. L., SHE, Z. S., SCHOLL, H. et FRISCH, U. Generation of large-scale structures in three-dimensional flows lacking parity invariance. *J. Fluid Mech.*, vol. 205, p. 341–358, 1989.
- TAO, L., WEISS, N. O., BROWNJOHN, D. P. et PROCTOR, M. R. E. Flux separation in stellar magnetoconvection. *Astrophys. J.*, vol. 496, p. L39, 1998.
- TENNEKES, H. et LUMLEY, J. L. *A first course in turbulence*. MIT Press, 1972.
- TITLE, A. M., TARBELL, T. D., TOPKA, K. P., FERGUSON, S. H., SHINE, R. A. et SOUP TEAM. Statistical properties of solar granulation derived from the SOUP instrument on Spacelab 2. *Astrophys. J.*, vol. 336, p. 475–494, 1989.
- TOOMRE, J., BRUMMELL, N., CATTANEO, F. et HURLBURT, N. E. Three-dimensional compressible convection at low Prandtl numbers. *Computer Phys. Communications*, vol. 59, p. 105–117, 1990.
- TOOMRE, J., GOUGH, D. O. et SPIEGEL, E. A. Time-dependent solutions of multimode convection equations. *J. Fluid Mech.*, vol. 125, p. 99–122, 1982.
- VAINSHTEIN, S., CATTANEO, F. et ROSNER, R. On magnetic diffusion in a turbulent fluid. *Bull. Am. Astron. Soc.*, vol. 23, p. 1049, 1991.

- VALDETTARO, L. et MENEGUZZI, M. Compressible MHD in spherical geometry. *Proceedings from the IAU Colloquium N. 130 - The Sun and cool stars : activity, magnetism, dynamos*. Springer-Verlag, 1990.
- VAN DER BORGHT, R. Nonlinear thermal convection in a layer with imposed energy flux. *Aus. J. Phys.*, vol. 27, p. 481–493, 1974.
- VERZICCO, R. et CAMUSSI, R. Numerical experiments on strongly turbulent thermal convection in a slender cylindrical cell. *J. Fluid Mech.*, vol. 477, p. 19–49, 2003.
- VINCENT, A. et MENEGUZZI, M. The dynamics of vorticity tubes in homogeneous turbulence. *J. Fluid Mech.*, vol. 258, p. 245, 1994.
- WANG, H. Do mesogranules exist? *Solar Phys.*, vol. 123, p. 21–32, 1989.
- WANG, H. et ZIRIN, H. Study of supergranules. *Solar Phys.*, vol. 120, p. 1–17, 1989.
- WARHAFT, Z. Passive scalars in turbulent flows. *Ann. Rev. Fluid Mech.*, vol. 32, p. 203–240, 2000.
- WEISS, N. O., BROWNJOHN, D. P., HURLBURT, N. E. et PROCTOR, M. R. E. Oscillatory convection in sunspot umbrae. *Mon. Not. R. astr. Soc.*, vol. 245, p. 434–452, 1990.
- WEISS, N. O., BROWNJOHN, D. P., MATTHEWS, P. C. et PROCTOR, M. R. E. Photospheric convection in strong magnetic fields. *Mon. Not. R. astr. Soc.*, vol. 283, p. 1153–1164, 1996.
- WEISS, N. O., PROCTOR, M. R. E. et BROWNJOHN, D. P. Magnetic flux separation in photospheric convection. *Mon. Not. R. astr. Soc.*, vol. 337, p. 293–304, 2002.
- WORDEN, S. P. Infrared observations of supergranule temperature structure. *Solar Phys.*, vol. 45, p. 521–532, 1975a.
- WORDEN, S. P. Solar supergranulation. *Ph.D. Thesis*, 1975b.
- WORDEN, S. P. et SIMON, G. W. A study of supergranulation using a diode array magnetograph. *Solar Phys.*, vol. 46, p. 73–91, 1976.
- YAKHOT, V. 4/5 Kolmogorov law for statistically stationary turbulence : Application to high-Rayleigh-number Bénard convection. *Phys. Rev. Letters*, vol. 69, p. 769–771, 1992.
- ZWAAN, C. Elements and patterns in the solar magnetic field. *Ann. Rev. Astron. Astrophys.*, vol. 25, p. 83–111, 1987.