

## Publication List of Tohru Ozawa

### I. Research Papers

1. Remarks on the space-time behavior of scattering solutions to the Schrödinger equations, Publ. RIMS, Kyoto Univ., **23**(1987), 479-486.
2. (with N. Hayashi) Time decay of solutions to the Cauchy problem for time-dependent Schrödinger-Hartree equations, Commun. Math. Phys., **110**(1987), 467-478.
3. (with N. Hayashi) Scattering theory in the weighted  $L^2(\mathbb{R}^n)$  spaces for some Schrödinger equations, Ann. Inst. Henri Poincaré, Physique théorique, **48**(1988), 17-37.
4. New  $L^p$ -estimates for solutions to the Schrödinger equations and time-asymptotic behavior of observables, Publ. RIMS, Kyoto Univ., **25**(1989), 521-577.
5. Lower  $L^p$  bounds for scattering solutions of the Schrödinger equations, Publ. RIMS, Kyoto Univ., **25**(1989), 579-586.
6. (with N. Hayashi) Smoothing effect for some Schrödinger equations, J. Funct. Anal., **85**(1989), 307-348.
7. (with N. Hayashi) Time decay for some Schrödinger equations, Math. Z., **200** (1989), 467-483.
8. (with N. Hayashi) Lower bounds for order of decay or of growth in time for solutions to linear and nonlinear Schrödinger equations, Publ. RIMS, Kyoto Univ., **25**(1989), 847-859.
9. Smoothing effects and dispersion of singularities for the Schrödinger evolution group, Arch. Rat. Mech. Anal., **110** (1990), 165-186.
10. (with H. Kozono) Relative bounds of closable operators in nonreflexive Banach spaces, Hokkaido Math. J., **19**(1990), 241-248.
11. Non-existence of positive commutators, Hiroshima Math. J., **20**(1990), 209-211.
12. (with H. Kozono) Stability in  $L^r$  for the Navier-Stokes flow in an  $n$ -dimensional bounded domain, J. Math. Anal. Appl., **152**(1990), 35-45.
13. Smoothing effect for the Schrödinger evolution equations with electric fields, in "Functional-Analytic Methods for Partial Differential Equations," Lecture Notes in Math., **1450**(1990), 226-235. Springer-Verlag.
14. Invariant subspaces for the Schrödinger evolution group, Ann. Inst. Henri Poincaré, Physique théorique, **54**(1991), 43-57.

15. Space-time behavior of propagator for Schrödinger evolution equations with Stark effect, *J. Funct. Anal.*, **97**(1991), 264-292.
16. (with T. Ogawa) Trudinger type inequalities and uniqueness of weak solutions for the nonlinear Schrödinger mixed problem, *J. Math. Anal. Appl.*, **155**(1991), 531-540.
17. Non-existence of wave operators for Stark effect Hamiltonians, *Math. Z.*, **207**(1991), 335-339.
18. (with A. Jensen) Classical and quantum scattering for Stark Hamiltonians with slowly decaying potentials, *Ann. Inst. Henri Poincaré, Physique théorique*, **54**(1991), 229-243.
19. Long range scattering for nonlinear Schrödinger equations in one space dimension, *Commun. Math. Phys.*, **139**(1991), 479-493.
20. (with N. Hayashi) On the derivative nonlinear Schrödinger equation, *Physica D* **55** (1992), 14-36.
21. Exact blow-up solutions to the Cauchy problem for the Davey-Stewartson systems, *Proc. Royal Soc. London, A* **436**(1992), 345-349.
22. (with Y. Tsutsumi) The nonlinear Schrödinger limit and the initial layer of the Zakharov equations, *Differential and Integral Eqs.*, **5**(1992), 721-745.
23. (with Y. Tsutsumi) Existence and smoothing effect of solutions for the Zakharov equations, *Publ. RIMS, Kyoto Univ.*, **28**(1992), 329-361.
24. (with H. Nawa) Nonlinear scattering with nonlocal interaction, *Commun. Math. Phys.*, **146**(1992), 259-276.
25. (with Y. Tsutsumi) On the initial value problem for the Zakharov equations, *Matemática Contemporânea*, **3**(1992), 149-164.
26. (with J. Ginibre) Long-range scattering for nonlinear Schrödinger and Hartree equations in space dimension  $n \geq 2$ , *Commun. Math. Phys.*, **151**(1993), 619-645.
27. (with Y. Tsutsumi) Asymptotic behavior of solutions for the coupled Klein-Gordon-Schrödinger equations, *Advanced Studies in Pure Math.*, **23**(1993), 295-305.
28. (with A. Jensen) Existence and non-existence results for wave operators for perturbations of the Laplacian, *Rev. Math. Phys.*, **5** (1993), 601-629.
29. (with Y. Tsutsumi) Global existence and asymptotic behavior of solutions for the Zakharov equations in three space dimensions, *Adv. Math. Sci. Appl.*, **3**(1994), 301-334.

30. (with N. Hayashi) Remarks on nonlinear Schrödinger equations in one space dimension, *Differential and Integral Eqs.*, **7**(1994), 453-461.
31. (with N. Hayashi) Modified wave operators for the derivative nonlinear Schrödinger equations, *Math. Annalen*, **298**(1994), 557-576.
32. (with J. Ginibre, G. Velo) On the existence of the wave operators for a class of nonlinear Schrödinger equations, *Ann. Inst. Henri Poincaré, Physique théorique*, **60**(1994), 211-239.
33. Wave propagation in even dimensional spaces, *Asymptotic Analysis*, **9**(1994), 163-176.
34. (with N. Hayashi) Finite energy solutions of nonlinear Schrödinger equations of derivative type, *SIAM J. Math. Anal.*, **25**(1994), 1488-1503.
35. Local decay estimates for Schrödinger operators with long-range potentials, *Ann. Inst. Henri Poincaré, Physique théorique*, **61**(1994), 135-151.
36. On critical cases of Sobolev's inequalities, *J. Funct. Anal.*, **127**(1995), 259-269.
37. Remarks on quadratic nonlinear Schrödinger equations, *Funkcialaj Ekvacioj* **38**(1995), 217-232.
38. (with K. Tsutaya, Y. Tsutsumi) Normal form and global solutions for the Klein-Gordon-Zakharov equations, *Ann. Inst. Henri Poincaré, Analyse non linéaire*, **12**(1995), 459-503.
39. (with N. Hayashi) Global, small radially symmetric solutions to nonlinear Schrödinger equations and a gauge transformation, *Differential and Integral Eqs*, **8**(1995), 1061-1072.
40. (with N. Hayashi, K. Kato) Dilation method and smoothing effect of the Schrödinger evolution group, *Rev. Math. Phys.*, **7**(1995), 1123-1132.
41. (with N. Hayashi) Schrödinger equations with nonlinearity of integral type, *Discrete and Continuous Dynamical Systems*, **1**(1995), 475-484.
42. (with K. Tsutaya, Y. Tsutsumi) Global existence and asymptotic behavior of solutions for the Klein-Gordon equations with quadratic nonlinearity in two space dimensions, *Math. Z.*, **222**(1996), 341-362.
43. (with N. Hayashi, K. Kato) Dilation method and smoothing effect of solutions to the Benjamin-Ono equation, *Proceedings of the Royal Society of Edinburgh*, **126**(1996), 273-285.
44. On the nonlinear Schrödinger equations of derivative type, *Indiana Univ. Math. J.*, **45**(1996), 137-163.

45. (with M. Nakamura) Low energy scattering for nonlinear Schrödinger equations in fractional order Sobolev spaces, *Rev. Math. Phys.*, **9**(1997), 397-410.
46. (with K. Tsutaya, Y. Tsutsumi) Remarks on the Klein-Gordon equation with quadratic nonlinearity in two space dimensions, *GAKUTO International Series, Math. Sci. Appl.*, **10**(1997), 383-392.
47. Characterization of Trudinger's inequality, *J. Inequal. Appl.*, **1**(1997), 369-374.
48. (with Y. Tsutsumi) Space-time estimates for null gauge forms and nonlinear Schrödinger equations, *Differential and Integral Eqs.*, **11**(1998), 201-222.
49. (with N. Hayashi, P. I. Naumkin) Scattering theory of the Hartree equation, *SIAM J. Math. Anal.*, **29**(1998), 1256-1267.
50. (with M. Nakamura) Nonlinear Schrödinger equations in the Sobolev space of critical order, *J. Funct. Anal.*, **155**(1998), 364-380.
51. Finite energy solutions for the Schrödinger equations with quadratic nonlinearity in one space dimension, *Funkcialaj Ekvacioj* **41**(1998), 451-468.
52. (with M. Nakamura) The Cauchy problem for nonlinear wave equations in the homogeneous Sobolev space, *Ann. Inst. Henri Poincaré, Physique théorique*, **71** (1999), 199-215.
53. (with M. Nakamura) The Cauchy problem for nonlinear wave equations in the Sobolev space of critical order, *Discrete and Continuous Dynamical Systems*, **5**(1999), 215-231.
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55. (with M. Nakamura) Global solutions in the critical Sobolev space for the wave equations with nonlinearity of exponential growth, *Math. Z.*, **231** (1999), 479-487.
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57. (with K. Tsutaya and Y. Tsutsumi) On the coupled system of nonlinear wave equations with different propagation speeds, *Banach Center Publications*, **52** (2000), 181-188.
58. (with M. Nakamura) Small solutions to nonlinear wave equations in the Sobolev spaces, *Houston J. Math.*, **27**(2001), 613-632.
59. (with M. Nakamura) The Cauchy problem for nonlinear Klein-Gordon equations in the Sobolev spaces, *Publ. RIMS, Kyoto Univ.*, **37**(2001), 255-293.
60. (with S. Machihara, K. Nakanishi) Nonrelativistic limit in the energy space for nonlinear Klein-Gordon equations, *Math. Annalen*, **322**(2002), 603-621.

61. (with K. Nakanishi) Remarks on scattering for nonlinear Schrödinger equations, *NoDEA*, **9**(2002), 45-68.
62. (with K. Nakanishi) Global solutions for nonlinear Schrödinger equations with arbitrarily growing nonlinearity and contracted initial data, *Kyushu J. Math.*, **56**(2002), 221-224.
63. (with M. Nakamura) Small data scattering for nonlinear Schrödinger, wave and Klein-Gordon equations, *Ann. Scuola Norm. Sup. Pisa Serie V*, **1**(2002), 435-460.
64. (with S. Machihara) Interpolation inequalities in Besov spaces, *Proc. AMS*, **131** (2002), 1553-1556.
65. (with S. Machihara, K. Nakanishi) Small global solutions and the nonrelativistic limit for the nonlinear Dirac equation, *Revista Matemática Iberoamericana*, **19** (2003), 179-194.
66. (with Y. Yamazaki) Life-span of smooth solutions to the complex Ginzburg-Landau type equation on torus, *Nonlinearity*, **16** (2003), 2029-2034.
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69. (with S. Machihara, M. Nakamura) Small global solutions for nonlinear Dirac equations, *Differential and Integral Eqs.*, **17** (2004), 623-636.
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71. (with K. Yamauchi) Structure of Dirac matrices and invariants for nonlinear Dirac equations, *Differential and Integral Equations*, **17** (2004), 971-982.
72. (with Y. Yamazaki) Smoothing effect and large time behavior of solutions to Schrödinger equations with nonlinearity of integral type, *Commun. Contemporary Math.*, **6** (2004), 681-703.
73. (with S. Machihara, M. Nakamura, K. Nakanishi) Endpoint Strichartz estimates and global solutions for the nonlinear Dirac equation, *J. Funct. Anal.*, **219** (2005), 1-20.
74. (with N. Kita) Sharp asymptotic behavior of solutions to nonlinear Schrödinger equations with repulsive interactions, *Commun. Contemporary Math.*, **7** (2005), 167-176.
75. (with R. Fukuizumi) Exponential decay of solutions to nonlinear elliptic equations with potentials, *Zeit. Angew. Math. Phys.*, **56** (2005), 1000-1011.

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77. (with R. Fukuizumi) On a decay property of solutions to the Haraux-Weissler equation, *J. Differential Equations*, **221** (2006), 134-142.
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80. (with Y. Cho) On the semi-relativistic Hartree type equation, *SIAM J. Math. Anal.*, **38** (2006), 1060-1074.
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82. (with J. Kato and M. Nakamura) A generalization of the weighted Strichartz estimates for the wave equations and an application to self-similar solutions, *Commun. Pure Appl. Math.*, **60** (2007), 164-186.
83. (with Y. Cho) On small amplitude solutions to the generalized Boussinesq equations, *Discrete and Continuous Dynamical Systems*, **17** (2007), 691-711.
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88. (with R. Carles) On the wave operators for the critical nonlinear Schrödinger equation, *Math. Res. Lett.*, **15** (2008), 185-195.
89. (with J. Fan) On the regularity criteria for the generalized Navier-Stokes equations and Lagrangian averaged Euler equations, *Differential and Integral Equations*, **21** (2008), 443-457.
90. (with R. Carles) A Poisson formula for the Schrödinger operator, *J. Fourier Anal. Appl.*, **14** (2008), 475-483.

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94. (with J. Fan) Regularity criterion for weak solutions to the Navier-Stokes equations in terms of the gradient of the pressure, *Journal of Inequalities and Applications* **2008** (2008), Article ID 412678, 6 pages.
95. (with Y. Cho, H. Sasaki, Y.-S. Shim) Remarks on the semirelativistic Hartree equations, *Discrete and Continuous Dynamical Systems A*, **23** (2009), 1277-1294.
96. (with J. Fan) Uniqueness of weak solutions to the Cauchy problem for the 3-D time-dependent Ginzburg-Landau model for superconductivity, *Differential and Integral Equations*, **22** (2009), 27-34.
97. (with Y. Cho and Y.-S. Shim) Elliptic estimates independent of domain expansion, *Calculus of Variations and PDE*, **34** (2009), 321-339.
98. (with K. Yamauchi) Remarks on analytic smoothing effect for the Schrödinger equation, *Math. Z.*, **261** (2009), 511-524.
99. (with J. Fan) Regularity criteria for the 3D density-dependent Boussinesq equations, *Nonlinearity*, **22** (2009), 553-568.
100. (with H. Sasaki) Inequalities associated with dilations, *Commun. Contemporary Math.*, **11** (2009), 265-277.
101. (with J. Fan) Regularity criteria for the magnetohydrodynamic equations with partial viscous terms and the Leray- $\alpha$ -MHD model, *Kinetic and Related Models*, **2** (2009), 293-305.
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105. (with J. Fan) Logarithmically improved regularity criteria for Navier-Stokes and related equations, *Math. Meth. Appl. Sci.*, **32** (2009), 2309-2318.
106. (with K. Yamauchi) Analytic smoothing effect for global solutions to nonlinear Schrödinger equations, *J. Math. Anal. Appl.*, **364** (2010), 492-497.
107. (with J. Fan) On regularity criterion for the 2D wave maps and the 4D biharmonic wave maps, *GAKUTO International Series, Math. Sci. Appl.*, **32** (2010), 69-83.
108. (with J. Fan) Global Cauchy problem for the 2-D magnetohydrodynamic- $\alpha$  models with partial viscous terms, *J. Math. Fluid Mech.*, **12** (2010), 306-319.
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110. (with J. Kato) Endpoint Strichartz estimates for the Klein-Gordon equation in two space dimensions and some applications, *J. Math. Pures Appl.*, **95** (2011), 48-71.
111. (with Y. Cho and S. Lee) On Hartree equations with derivatives, *Nonlinear Analysis Series A: Theory, Methods & Applications*, **74**(2011), 2094-2108.
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113. (with Y. Cho and S. Xia) Remarks on some dispersive estimates, *Commun. Pure and Appl. Anal.*, **10**(2011), 1121-1128.
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