Applications of AdS/CFT in Quark Gluon Plasma
Atmaja, A.N.

BIBLIOGRAPHY

[1] M. B. Green, J. H. Schwarz and E. Witten, "SUPERSTRING THEORY. VOL. 1: INTRODUCTION," *C*ambridge, Uk: Univ. Pr. (1987) 469 P. (Cambridge Monographs On Mathematical Physics); J. Polchinski, "String theory. Vol. 1: An introduction to the bosonic string," *C*ambridge, UK: Univ. Pr. (1998) 402 p; K. Becker, M. Becker and J. H. Schwarz, "String theory and M-theory: A modern introduction," *C*ambridge, UK: Cambridge Univ. Pr. (2007) 739 p.

[2] J. M. Maldacena, "The large N limit of superconformal field theories and supergravity," Adv. Theor. Math. Phys. **2** (1998) 231 [Int. J. Theor. Phys. **38** (1999) 1113] [arXiv:hep-th/9711200].

[3] S. S. Gubser, I. R. Klebanov and A. M. Polyakov, "Gauge theory correlators from non-critical string theory," Phys. Lett. B **428**, 105 (1998) [arXiv:hep-th/9802109].

[4] E. Witten, "Anti-de Sitter space and holography," Adv. Theor. Math. Phys. **2**, 253 (1998) [arXiv:hep-th/9802150].

[5] S. Caron-Huot, P. Kovtun, G. D. Moore, A. Starinets and L. G. Yaffe, "Photon and dilepton production in supersymmetric Yang-Mills plasma," JHEP **0**612, 015 (2006) [arXiv:hep-th/0607237].

[6] B. Duplantier, "Brownian Motion, 'Diverse and Undulating'," arXiv:0705.1951v1 [cond-mat.stat-mech].

[7] G. 't Hooft, "A planar diagram theory for strong interactions," Nucl. Phys. B **72**, 461 (1974).

[8] F. Karsch, "Lattice simulations of the thermodynamics of strongly interacting elementary particles and the exploration of new phases of matter in relativistic heavy ion collisions," J. Phys. Conf. Ser. **46**, 122 (2006) [arXiv:hep-lat/0608003].

[9] E. Witten, "Anti-de Sitter space, thermal phase transition, and confinement in gauge theories," Adv. Theor. Math. Phys. **2**, 505 (1998) [arXiv:hep-th/9803131].

[10] L. Susskind and E. Witten, "The holographic bound in anti-de Sitter space," arXiv:hep-th/9805114.

[11] G. Policastro, D. T. Son and A. O. Starinets, "From AdS/CFT correspondence to hydrodynamics," JHEP **0**209, 043 (2002) [arXiv:hep-th/0205052].

[12] J. Erlich, E. Katz, D. T. Son and M. A. Stephanov, "QCD and a holographic model of hadrons," Phys. Rev. Lett. **9**5, 261602 (2005) [arXiv:hep-ph/0501128].

[13] J. de Boer, E. P. Verlinde and H. L. Verlinde, "On the holographic renormalization group," JHEP **0**008, 003 (2000) [arXiv:hep-th/9912012].

[14] M. A. Shifman, A. I. Vainshtein and V. I. Zakharov, "QCD And Resonance Physics. Sum Rules," Nucl. Phys. B **1**47, 385 (1979).

[15] A. Karch, E. Katz, D. T. Son and M. A. Stephanov, "Linear confinement and AdS/QCD," Phys. Rev. D **7**4, 015005 (2006) [arXiv:hep-ph/0602229].

[16] C. P. Herzog, "A holographic prediction of the deconfinement temperature," Phys. Rev. Lett. **9**8, 091601 (2007) [arXiv:hep-th/0608151].

[17] http://www.gsi.de/fair/experiments/CBM/Phasendiagram.jpg.

[18] http://gruppo3.ca.infn.it/usai/images/dileptons.jpg.

[19] A. Nata Atmaja and K. Schalm, "Photon and Dilepton Production in Soft Wall AdS/QCD," arXiv:0802.1460 [hep-th]. Published in JHEP 1008:124, 2010.

[20] A. N. Atmaja, J. de Boer and M. Shigemori, "Holographic Brownian Motion and Time Scales in Strongly Coupled Plasmas," arXiv:1002.2429 [hep-th]. To be published in Nucl. Phys. B.

[21] A. Nata Atmaja and K. Schalm, "Drag Force in 4D Kerr-AdS Black Hole," work in progress.

[22] M. Bianchi, D. Z. Freedman and K. Skenderis, "Holographic Renormalization," Nucl. Phys. B **6**31, 159 (2002) [arXiv:hep-th/0112119].

[23] D. Mateos, "String theory and RHIC physics: The fundamental story," String Conference 2007, Madrid, Spain.
D. Mateos and L. Patiño, "Bright branes for strongly coupled plasmas," JHEP **0**711, 025 (2007) [arXiv:0709.2168 [hep-th]].

[24] P. Stankus, "Direct photon production in relativistic heavy-ion collisions," Ann. Rev. Nucl. Part. Sci. **5**5, 517 (2005).

[25] M. Le Bellac, "Thermal Field Theory," Cambridge (1996). *C*ambridge, UK: Univ. Pr. (1996)

[26] D. T. Son and A. O. Starinets, "Minkowski-space correlators in AdS/CFT correspondence: Recipe and applications," JHEP **0**209, 042 (2002) [arXiv:hep-th/0205051].

[27] S. Scherer and M. R. Schindler, "A chiral perturbation theory primer," arXiv:hep-ph/0505265.

[28] P. K. Kovtun and A. O. Starinets, "Quasinormal modes and holography," Phys. Rev. D **7**2, 086009 (2005) [arXiv:hep-th/0506184].

[29] F. W. J. Olver, "The Asymptotic Solution of Linear Differential Equations of Second Order fro Large Values of a Parameter," Phil. Trans. Roy. Soc. Lon. Series A. Mathematical and Physical Sciences, 930 **2**47, (1954); F. W. J. Olver, "Asymptotics and Special Functions," A K Peters, Wellesley (1997).

[30] P. Kovtun, D. T. Son and A. O. Starinets, "Holography and hydrodynamics: Diffusion on stretched horizons," JHEP **0**310, 064 (2003) [arXiv:hep-th/0309213].

[31] D. Mateos, R. C. Myers and R. M. Thomson, "Holographic viscosity of fundamental matter," Phys. Rev. Lett. **9**8, 101601 (2007) [arXiv:hep-th/0610184].

[32] R. Brown, "A brief account of microscopical observations made in the months of June, July and August, 1827, on the particles contained in the pollen of plants; and on the general existence of active molecules in organic and inorganic bodies," Philos. Mag. **4**, 161 (1828); reprinted in Edinburgh New Philos. J. **5**, 358 (1928).

[33] G. E. Uhlenbeck and L. S. Ornstein, "On The Theory Of The Brownian Motion," Phys. Rev. **3**6, 823 (1930); S. Chandrasekhar, "Stochastic problems in physics and astronomy," Rev. Mod. Phys. **1**5, 1 (1943); M. C. Wang and G. E. Uhlenbeck, "On the Theory of the Brownian Motion II," Rev. Mod. Phys. **1**7, 323 (1945).

[34] P. Kovtun, D. T. Son and A. O. Starinets, "Viscosity in strongly interacting quantum field theories from black hole physics," Phys. Rev. Lett. **9**4, 111601 (2005) [arXiv:hep-th/0405231].

[35] C. P. Herzog, A. Karch, P. Kovtun, C. Kozcaz and L. G. Yaffe, "Energy loss of a heavy quark moving through N = 4 supersymmetric Yang-Mills plasma," JHEP **0**607, 013 (2006) [arXiv:hep-th/0605158].

[36] A. Karch and E. Katz, "Adding flavor to AdS/CFT," JHEP **0**206, 043 (2002) [arXiv:hep-th/0205236].

[37] J. Erdmenger, N. Evans, I. Kirsch and E. Threlfall, "Mesons in Gauge/Gravity Duals - A Review," Eur. Phys. J. A **3**5, 81 (2008) [arXiv:0711.4467 [hep-th]].

[38] H. Liu, K. Rajagopal and U. A. Wiedemann, "Calculating the jet quenching parameter from AdS/CFT," Phys. Rev. Lett. **9**7, 182301 (2006) [arXiv:hep-ph/0605178].

[39] S. S. Gubser, "Drag force in AdS/CFT," Phys. Rev. D **74**, 126005 (2006) [arXiv:hep-th/0605182].

[40] C. P. Herzog, "Energy loss of heavy quarks from asymptotically AdS geometries," JHEP **0**609, 032 (2006) [arXiv:hep-th/0605191].

[41] J. Casalderrey-Solana and D. Teaney, "Heavy quark diffusion in strongly coupled N = 4 Yang Mills," Phys. Rev. D **7**4, 085012 (2006) [arXiv:hep-ph/0605199].

[42] C. P. Herzog and D. T. Son, "Schwinger-Keldysh propagators from AdS/CFT correspondence," JHEP **0**303, 046 (2003) [arXiv:hep-th/0212072].

[43] J. Polchinski, "Dirichlet-Branes and Ramond-Ramond Charges," Phys. Rev. Lett. **7**5, 4724 (1995) [arXiv:hep-th/9510017].

[44] O. Aharony, S. S. Gubser, J. M. Maldacena, H. Ooguri and Y. Oz, "Large N field theories, string theory and gravity," Phys. Rept. **3**23, 183 (2000) [arXiv:hep-th/9905111].

[45] A. J. Niemi and G. W. Semenoff, "Finite Temperature Quantum Field Theory In Minkowski Space," Annals Phys. **1**52, 105 (1984).

[46] V. Balasubramanian, P. Kraus, A. E. Lawrence and S. P. Trivedi, "Holographic probes of anti-de Sitter space-times," Phys. Rev. D **5**9, 104021 (1999) [arXiv:hep-th/9808017].

[47] V. Balasubramanian, S. B. Giddings and A. E. Lawrence, "What do CFTs tell us about anti-de Sitter spacetimes?," JHEP **9**903, 001 (1999) [arXiv:hep-th/9902052].

[48] V. Balasubramanian, P. Kraus and A. E. Lawrence, "Bulk vs. boundary dynamics in anti-de Sitter spacetime," Phys. Rev. D **5**9, 046003 (1999) [arXiv:hep-th/9805171].

[49] J. B. Hartle and S. W. Hawking, "Path Integral Derivation Of Black Hole Radiance," Phys. Rev. D **1**3, 2188 (1976).

[50] W. G. Unruh, "Notes on black hole evaporation," Phys. Rev. D **1**4, 870 (1976).

[51] W. Israel, "Thermo field dynamics of black holes," Phys. Lett. A **57**, 107 (1976).

[52] E. Barnes, D. Vaman, C. Wu and P. Arnold, "Real-time finite-temperature correlators from AdS/CFT," arXiv:1004.1179 [hep-th].

[53] S. S. Gubser, "Momentum fluctuations of heavy quarks in the gauge-string duality," Nucl. Phys. B **7**90, 175 (2008) [arXiv:hep-th/0612143].

[54] H. Liu, K. Rajagopal and U. A. Wiedemann, "Wilson loops in heavy ion collisions and their calculation in AdS/CFT," JHEP **0**703, 066 (2007) [arXiv:hep-ph/0612168].

[55] J. Casalderrey-Solana and D. Teaney, "Transverse momentum broadening of a fast quark in a N = 4 Yang Mills plasma," JHEP **0**704, 039 (2007) [arXiv:hep-th/0701123].

[56] S. Bhattacharyya, V. E. Hubeny, S. Minwalla and M. Rangamani, "Nonlinear Fluid Dynamics from Gravity," JHEP **0**802, 045 (2008) [arXiv:0712.2456 [hep-th]].

[57] S. Bhattacharyya *e*t al., "Local Fluid Dynamical Entropy from Gravity," JHEP **0**806, 055 (2008) [arXiv:0803.2526 [hep-th]].

[58] P. M. Chesler and L. G. Yaffe, "Horizon formation and far-from-equilibrium isotropization in supersymmetric Yang-Mills plasma," Phys. Rev. Lett. **1**02, 211601 (2009) [arXiv:0812.2053 [hep-th]].

[59] P. M. Chesler and L. G. Yaffe, "The wake of a quark moving through a strongly-coupled $\mathcal{N} = 4$ supersymmetric Yang-Mills plasma," Phys. Rev. Lett. **9**9, 152001 (2007) [arXiv:0706.0368 [hep-th]].

[60] P. M. Chesler and L. G. Yaffe, "The stress-energy tensor of a quark moving through a strongly-coupled N=4 supersymmetric Yang-Mills plasma: comparing hydrodynamics and AdS/CFT," Phys. Rev. D **78**, 045013 (2008) [arXiv:0712.0050 [hep-th]].

[61] F. Becattini, F. Piccinini and J. Rizzo, "Angular momentum conservation in heavy ion collisions at very high energy," Phys. Rev. C **7**7, 024906 (2008) [arXiv:0711.1253 [nucl-th]].

[62] N. Armesto *e*t al., "Heavy Ion Collisions at the LHC - Last Call for Predictions," J. Phys. G **3**5, 054001 (2008) [arXiv:0711.0974 [hep-ph]].

[63] D. T. Son and A. O. Starinets, "Viscosity, Black Holes, and Quantum Field Theory," Ann. Rev. Nucl. Part. Sci. **5**7, 95 (2007) [arXiv:0704.0240 [hep-th]].

[64] A. E. Lawrence and E. J. Martinec, "Black Hole Evaporation Along Macroscopic Strings," Phys. Rev. D **50**, 2680 (1994) [arXiv:hep-th/9312127].

[65] S. J. Rey and J. T. Yee, "Macroscopic strings as heavy quarks in large N gauge theory and anti-de Sitter supergravity," Eur. Phys. J. C **22**, 379 (2001) [arXiv:hep-th/9803001].

[66] R. C. Myers, A. O. Starinets and R. M. Thomson, "Holographic spectral functions and diffusion constants for fundamental matter," JHEP **0**711, 091 (2007) [arXiv:0706.0162 [hep-th]].

[67] J. de Boer, V. E. Hubeny, M. Rangamani and M. Shigemori, "Brownian motion in AdS/CFT," JHEP **0**907, 094 (2009) [arXiv:0812.5112 [hep-th]].

[68] D. T. Son and D. Teaney, "Thermal Noise and Stochastic Strings in AdS/CFT," JHEP **0**907, 021 (2009) [arXiv:0901.2338 [hep-th]].

[69] G. C. Giecold, E. Iancu and A. H. Mueller, "Stochastic trailing string and Langevin dynamics from AdS/CFT," JHEP **0**907, 033 (2009) [arXiv:0903.1840 [hep-th]].

[70] G. C. Giecold, "Heavy quark in an expanding plasma in AdS/CFT," JHEP **0**906, 002 (2009) [arXiv:0904.1874 [hep-th]].

[71] J. Casalderrey-Solana, K. Y. Kim and D. Teaney, "Stochastic String Motion Above and Below the World Sheet Horizon," JHEP **0**912, 066 (2009) [arXiv:0908.1470 [hep-th]].

[72] K. Skenderis, "Lecture notes on holographic renormalization," Class. Quant. Grav. **19**, 5849 (2002) [arXiv:hep-th/0209067].

[73] K. Skenderis and B. C. van Rees, "Real-time gauge/gravity duality: Prescription, Renormalization and Examples," JHEP **0**905, 085 (2009) [arXiv:0812.2909 [hep-th]].

[74] B. C. van Rees, "Real-time gauge/gravity duality and ingoing boundary conditions," arXiv:0902.4010 [hep-th].

[75] R. Kubo, "The fluctuation-dissipation theorem," Rep. Prog. Phys. **29**, 255-284 (1966).

[76] H. Mori, "Transport, collective motion, and Brownian motion," Prog. Theor. Phys. **3**3, 423 (1965).

[77] R. Kubo, M. Toda, and N. Hashitsume, "Statistical Physics II – Nonequilibrium Statistical Mechanics," Springer-Verlag.

[78] M. Chernicoff, J. A. Garcia and A. Guijosa, "A Tail of a Quark in N=4 SYM," JHEP **0**909, 080 (2009) [arXiv:0906.1592 [hep-th]].

[79] N. D. Birrell and P. C. W. Davies, "Quantum Fields In Curved Space," *C*ambridge, UK: Univ. Pr. (1982) 340p

[80] K. Behrndt, M. Cvetic and W. A. Sabra, "Non-extreme black holes of five dimensional N = 2 AdS supergravity," Nucl. Phys. B **5**53, 317 (1999) [arXiv:hep-th/9810227].

[81] M. Cvetic *et* al., "Embedding AdS black holes in ten and eleven dimensions," Nucl. Phys. B **5**58, 96 (1999) [arXiv:hep-th/9903214].

[82] P. Kraus, F. Larsen and S. P. Trivedi, "The Coulomb branch of gauge theory from rotating branes," JHEP **9**903, 003 (1999) [arXiv:hep-th/9811120].

[83] J. G. Russo and K. Sfetsos, "Rotating D3 branes and QCD in three dimensions," Adv. Theor. Math. Phys. **3**, 131 (1999) [arXiv:hep-th/9901056].

[84] E. Caceres and A. Guijosa, "Drag force in charged N = 4 SYM plasma," JHEP **0**611, 077 (2006) [arXiv:hep-th/0605235].

[85] C. P. Herzog and A. Vuorinen, "Spinning Dragging Strings," JHEP **0**710, 087 (2007) [arXiv:0708.0609 [hep-th]].

[86] T. Harmark, J. Natario and R. Schiappa, "Greybody Factors for d-Dimensional Black Holes," arXiv:0708.0017 [hep-th].

[87] J. Dunkel and P. Hänggi, "Relativistic Brownian Motion," arXiv:0812.1996 [cond-mat].

[88] P. Hänggi, P. Talkner and M. Borkovec, "Reaction-rate theory: fifty years after Kramers," Rev. Mod. Phys. **6**2, 251 (1990).

[89] A.A. Dubkov, P. Hänggi, and I. Goychuk, "Non-linear Brownian motion: the problem of obtaining the thermal Langevin equation for a non-Gaussian bath," J. Stat. Mech. P01034 (2009).

[90] G. F. Efremov "A Fluctuation Dissipation Theorem for Nonlinear Media," Sov. Phys. JETP **2**8, 1232 (1969); M. S. Gupta, "Thermal fluctuations in driven nonlinear resistive systems," Phys. Rev. A **1**8, 2725 (1978); M. G. Gupta, "Thermal Noise in Nonlinear Resistive Devices and Its Circuit Representation," Proc. IEEE **7**0, 788 (1982); G. N. Bochkov, Yu. E. Kuzovlev, "Nonlinear fluctuation-dissipation relations and stochastic models in nonequilibrium thermodynamics : I. Generalized fluctuation-dissipation theorem," Physica A **1**06, 443 (1981); E. Wang and U. Heinz, "Generalized fluctuation-dissipation theorem for nonlinear response functions," Phys. Rev. D **6**6, 025008 (2002)

[91] S. D. Avramis and K. Sfetsos, "Supergravity and the jet quenching parameter in the presence of R-charge densities," JHEP **0**701, 065 (2007) [arXiv:hep-th/0606190].

[92] S. D. Avramis, K. Sfetsos and D. Zoakos, "On the velocity and chemical-potential dependence of the heavy-quark interaction in N = 4 SYM plasmas," Phys. Rev. D **7**5, 025009 (2007) [arXiv:hep-th/0609079].

[93] N. Armesto, J. D. Edelstein and J. Mas, "Jet quenching at finite 't Hooft coupling and chemical potential from AdS/CFT," JHEP **0**609, 039 (2006) [arXiv:hep-ph/0606245].

[94] F. L. Lin and T. Matsuo, "Jet quenching parameter in medium with chemical potential from AdS/CFT," Phys. Lett. B **6**41, 45 (2006) [arXiv:hep-th/0606136].

[95] J. Mas, "Shear viscosity from R-charged AdS black holes," JHEP **0**603, 016 (2006) [arXiv:hep-th/0601144].

[96] M. Cvetic and S. S. Gubser, "Thermodynamic Stability and Phases of General Spinning Branes," JHEP **9**907, 010 (1999) [arXiv:hep-th/9903132].

[97] S. Bhattacharyya, S. Lahiri, R. Loganayagam and S. Minwalla, "Large rotating AdS black holes from fluid mechanics," JHEP **0**809, 054 (2008) [arXiv:0708.1770 [hep-th]].

[98] P. Hayden and J. Preskill, "Black holes as mirrors: quantum information in random subsystems," JHEP **0**709, 120 (2007) [arXiv:0708.4025 [hep-th]].

[99] Y. Sekino and L. Susskind, "Fast Scramblers," JHEP **0**810, 065 (2008) [arXiv:0808.2096 [hep-th]].

[100] P. Arnold and L. G. Yaffe, "Effective theories for real-time correlations in hot plasmas," Phys. Rev. D **5**7, 1178 (1998) [arXiv:hep-ph/9709449].

[101] N. Iqbal and H. Liu, "Universality of the hydrodynamic limit in AdS/CFT and the membrane paradigm," arXiv:0809.3808 [hep-th].

[102] L. Fidkowski, V. Hubeny, M. Kleban and S. Shenker, "The black hole singularity in AdS/CFT," JHEP **0**402, 014 (2004) [arXiv:hep-th/0306170].

[103] E. V. Shuryak, "Strongly coupled quark-gluon plasma: The status report," arXiv:hep-ph/0608177.

[104] P. F. Kolb, J. Sollfrank and U. W. Heinz, "Anisotropic transverse flow and the quark-hadron phase transition," Phys. Rev. C **6**2, 054909 (2000) [arXiv:hep-ph/0006129].

[105] P. F. Kolb, P. Huovinen, U. W. Heinz and H. Heiselberg, "Elliptic flow at SPS and RHIC: From kinetic transport to hydrodynamics," Phys. Lett. B **5**00, 232 (2001) [arXiv:hep-ph/0012137].

[106] P. F. Kolb and U. W. Heinz, "Hydrodynamic description of ultrarelativistic heavy-ion collisions," arXiv:nucl-th/0305084.

[107] J. M. Maldacena, "Wilson loops in large N field theories," Phys. Rev. Lett. **8**0, 4859 (1998) [arXiv:hep-th/9803002].

[108] S. J. Rey, S. Theisen and J. T. Yee, "Wilson-Polyakov loop at finite temperature in large N gauge theory and anti-de Sitter supergravity," Nucl. Phys. B **5**27, 171 (1998) [arXiv:hep-th/9803135].

[109] S. Hemming and L. Thorlacius, "Thermodynamics of Large AdS Black Holes," JHEP **0**711, 086 (2007) [arXiv:0709.3738 [hep-th]].

[110] S. W. Hawking, C. J. Hunter and M. Taylor, "Rotation and the AdS/CFT correspondence," Phys. Rev. D **5**9, 064005 (1999) [arXiv:hep-th/9811056].

[111] G. W. Gibbons, M. J. Perry and C. N. Pope, "The first law of thermodynamics for Kerr - anti-de Sitter black holes," Class. Quant. Grav. **2**2, 1503 (2005) [arXiv:hep-th/0408217].