

Curriculum Vitae for Richard Fitzpatrick: October 2020

Personal Details:

Full Name: Richard Fitzpatrick
Nationality: U.S. (Naturalized 2008. Formerly UK)
Date of Birth: 15th August, 1963

Education:

MA (Physics), University of Cambridge, First class hon. (triple first) (1984).

D.Phil (Astronomy), University of Sussex, *The Axisymmetric Pulsar Magnetosphere*, supervised by Prof. L. Mestel, FRS (1988).

Employment:

August 2006 to date: Professor & Research Scientist, Department of Physics & Institute for Fusion Studies, University of Texas at Austin.

September 2000 to August 2006: Associate Professor & Research Scientist, Department of Physics & Institute for Fusion Studies, University of Texas at Austin.

January 1994 to August 2000: Assistant Professor & Research Scientist, Department of Physics & Institute for Fusion Studies, University of Texas at Austin.

October 1987 to December 1993: Senior Scientific Officer, Culham Laboratory, United Kingdom Atomic Energy Authority.

Ph.D. Student Supervision:

Edmund P. Yu: *Dynamics of tearing modes in reversed field pinches*, 2001.

Andrew Cole: *Forced magnetic reconnection in tokamak plasmas*, 2006.

Ryan White: *Resistive instabilities in magnetically confined fusion plasmas with velocity shear and rotation*, 2015.

Service:

Member of Royal Astronomical Society since 1988.

Fellow of American Physical Society since 2003.

Regular reviewer for Physical Review Letters, Physics of Plasmas, Plasma Physics and Controlled Fusion, and Nuclear Fusion.

Regular grant reviewer for the U.S. Office of Fusion Energy Sciences.

Chairman of Graduate Recruitment Committee of Physics Department.

College of Natural Sciences Teaching Excellence Award, 2015.

Nominated for Regent's Teaching Award, 2016.

Member of Editorial Board, Plasma Physics and Controlled Fusion.

Top Referee Award, Nuclear Fusion, 2018.

Journal Articles:

1. R. Fitzpatrick, and L. Mestel, *Pulsar electrodynamics-I*, Mon. Not. R. astr. Soc. **232**, 277 (1988).
2. R. Fitzpatrick, and L. Mestel, *Pulsar electrodynamics-II*, Mon. Not. R. astr. Soc. **232**, 303 (1988).
3. C.M. Bishop, R. Fitzpatrick, R.J. Hastie, and J.C. Jackson, *Alpha particle induced magnetoacoustic instability in a thermonuclear plasma*, Plasma Phys. Control. Fusion **31**, 431 (1989).
4. R. Fitzpatrick, *On the stability of equilibria with unorthodox $q(r)$ profiles to the resistive internal kink mode*, Plasma Phys. Control. Fusion **31**, 1127 (1989).
5. R. Fitzpatrick, *Linear stability of low mode number tearing modes in the banana collisionality regime*, Phys. Fluids B **1**, 2381 (1989).
6. R. Fitzpatrick, *The effect of trapped particles on the linear stability of long wavelength resistive modes*, Phys. Fluids B **2**, 2636 (1990).
7. R. Fitzpatrick, and T.C. Hender, *The interaction of resonant magnetic perturbations with rotating plasmas*, Phys. Fluids B **3**, 644 (1991).
8. R. Fitzpatrick, C.G. Gimblett, and R.J. Hastie, *On the "1½-D" evolution of tokamak plasmas in the case of large aspect ratio*, Plasma Phys. Control. Fusion **34**, 161 (1992).
9. A.W. Morris, P.G. Carolan, R. Fitzpatrick, T.C. Hender, and T.N. Todd, *Driven magnetic reconnection in the COMPASS-C tokamak*, Phys. Fluids B **4**, 413 (1992).
10. R.J. La Haye, R. Fitzpatrick, T.C. Hender, A.W. Morris, J.T. Scoville, and T.N. Todd, *Critical error fields for locked mode instability in tokamaks*, Phys. Fluids B **4**, 2098 (1992).
11. T.C. Hender, R. Fitzpatrick, A.W. Morris, *et al.*, *Effect of resonant magnetic perturbations on COMPASS-C tokamak discharges*, Nucl. Fusion **32**, 2091 (1992).
12. R. Fitzpatrick, *The interaction of tearing modes with external structures in cylindrical geometry*, Nucl. Fusion **33**, 1049 (1993).

13. R. Fitzpatrick, R.J. Hastie, T.J. Martin, and C.M. Roach, *Stability of coupled tearing modes in tokamaks*, Nucl. Fusion **33**, 1533 (1993).
14. R. Fitzpatrick, *Effect of a nonuniform resistive wall on the stability of tokamak plasmas*, Phys. Plasmas **1**, 2931 (1994).
15. R. Fitzpatrick, *Stability of coupled tearing and twisting modes in tokamaks*, Phys. Plasmas **1**, 3308 (1994).
16. R. Fitzpatrick, and T.C. Hender, *Effect of a static magnetic perturbation on resistive mode stability in tokamaks*, Phys. Plasmas **1**, 3337 (1994).
17. R. Fitzpatrick, *Helical temperature perturbations associated with tearing modes in tokamak plasmas*, Phys. Plasmas **2**, 825 (1995).
18. R. Fitzpatrick, and A.Y. Aydemir, *Stabilization of the resistive shell mode in tokamaks*, Nucl. Fusion **36**, 11 (1996).
19. R. Fitzpatrick, and T.H. Jensen, *Stabilization of the resistive wall mode using a fake rotating shell*, Phys. Plasmas **3**, 2641 (1996).
20. F.L. Waelbroeck, and R. Fitzpatrick, *Rotation and locking of magnetic islands*, Phys. Rev. Lett. **78**, 1703 (1997).
21. R. Fitzpatrick, and E.P. Yu, *Angular momentum injection into a Penning-Malmberg trap*, Phys. Plasmas **4**, 917 (1997).
22. R. Fitzpatrick, *Feedback stabilization of the resistive shell mode in a tokamak fusion reactor*, Phys. Plasmas **4**, 2519 (1997).
23. T.H. Jensen, and R. Fitzpatrick, *Resistive wall feedback stabilization*, Phys. Plasmas **4**, 2997 (1997).
24. R. Fitzpatrick, *The effect of a partial resistive shell on the magnetohydrodynamical stability of tokamak plasmas*, Phys. Plasmas **4**, 4043 (1997).
25. R. Fitzpatrick, and E.P. Yu, *Optimum design of feedback coils for the control of external modes in tokamaks*, Phys. Plasmas **5**, 2340 (1998).
26. R. Fitzpatrick, *Bifurcated states of a rotating tokamak plasma in the presence of a static error-field*, Phys. Plasmas **5**, 3325 (1998).
27. R. Fitzpatrick, *Formation and locking of the “slinky mode” in reversed field pinches*, Phys. Plasmas **6**, 1168 (1999).
28. R. Fitzpatrick, and E.P. Yu, *Feedback stabilization of resistive shell modes in a reversed field pinch*, Phys. Plasmas **6**, 3536 (1999).
29. R. Fitzpatrick, S.C. Guo, D.J. Den Hartog, and C.C. Hegna, *Effect of a resistive vacuum vessel on dynamo mode rotation in reversed field pinches*, Phys. Plasmas **6**, 3878 (1999).
30. R. Fitzpatrick, and E.P. Yu, *Nonlinear dynamo mode dynamics in reversed field pinches*, Phys. Plasmas **7**, 3610 (2000).

31. R. Fitzpatrick, F. L. Waelbroeck, *Nonlinear dynamics of feedback modulated magnetic islands in toroidal plasmas*, Phys. Plasmas **7**, 4983 (2000).
32. A. Bhattacharjee, R. Fitzpatrick, and Xiaogang Wang, *Comment on "Improved boundary layer analysis of forced magnetic reconnection due to a boundary perturbation"* [Phys. Plasmas **7**, 875 (2000)], Phys. Plasmas **8**, 374 (2001).
33. R. Fitzpatrick, *Conceptual design of an active feedback system for the control of the resistive shell mode in tokamaks*, Phys. Plasmas **8**, 871 (2001).
34. R. Fitzpatrick, and E. Rossi, *Control of tearing modes in toroidal fusion experiments using "designer" error-fields*, Phys. Plasmas **8**, 2760 (2001).
35. R. Fitzpatrick, E. Rossi, and E.P. Yu, *Improved evolution equations for magnetic island chains in toroidal pinch plasmas subject to externally applied resonant magnetic perturbations*, Phys. Plasmas **8**, 4489, (2001).
36. R. Fitzpatrick, and P. Zanca, *Phase-locking of tearing modes in the reversed field experiment*, Phys. Plasmas **9**, 2707 (2002).
37. R. Fitzpatrick, *A simple model of the resistive wall mode in tokamaks*, Phys. Plasmas **9**, 3459, (2002).
38. E. Lazzaro, R.J. Buttery, T.C. Hender, P. Zanca, R. Fitzpatrick, M. Bigi, T. Bolzonella, R. Coelho, M. DeBenedetti, S. Nowak, O. Sauter, and, M. Stamp, *Error field locked modes thresholds in rotating plasmas, anomalous braking and spin-up*, Phys. Plasmas **9**, 3906, (2002).
39. R. Fitzpatrick, *Plasma parameter scaling of the error-field penetration threshold in tokamaks*, Phys. Plasmas **10**, 1782 (2003).
40. R. Fitzpatrick, *A numerical study of forced magnetic reconnection in the viscous Taylor problem*, Phys. Plasmas **10**, 2304 (2003).
41. R. Fitzpatrick, A. Bhattacharjee, Z.W. Ma, and T. Linde, *Wave driven magnetic reconnection in the Taylor problem*, Phys. Plasmas **10**, 4284 (2003).
42. R. Fitzpatrick, *Scaling of forced magnetic reconnection in the Hall-magnetohydrodynamical Taylor problem*, Phys. Plasmas **11**, 937 (2004).
43. S.A. Sabbagh, J.M. Bialek, R.E. Bell, A.H. Glasser, B.P. LeBlanc, J.E. Menard, F. Paoletti, M.G. Bell, R. Fitzpatrick, E.D. Fredrickson, A.M. Garofalo, D.A. Gates, S.M. Kaye, L.L. Lao, R. Maingi, D. Mueller, G.A. Navratil, D. Stutman, W. Zhu, and the NSTX Reseach Team, *The resistive wall mode and feedback control physics design in NSTX*, Nucl. Fusion **44**, 560 (2004).
44. B.E. Chapman, R. Fitzpatrick, D. Craig, P. Martin, and G. Spizzo, *Observation of tearing mode deceleration and locking due to eddy currents induced in a conducting shell*, Phys. Plasmas **11**, 2156 (2004).
45. M. Shilov, C. Cates, R. James, A. Klein, O. Katsuro-Hopkins, Y. Liu, M.E. Mauel, D.A. Mauer, G.A. Navratil, T.S. Pedersen, N. Stillis, R. Fitzpatrick, and S.F. Paul,

- Dynamical plasma response of resistive wall modes to changing external magnetic perturbations*, Phys. Plasmas **11**, 2573 (2004).
46. A. Cole, and R. Fitzpatrick, *Forced magnetic reconnection in the inviscid Taylor problem*, Phys. Plasmas **11**, 3525 (2004).
 47. R. Fitzpatrick, *Scaling of forced magnetic reconnection in the Hall-magnetohydrodynamical Taylor problem with arbitrary guide-field*, Phys. Plasmas **11**, 3961 (2004).
 48. R. Fitzpatrick, and F. Porcelli, *Collisionless magnetic reconnection with arbitrary guide field*, Phys. Plasmas **11**, 4713 (2004).
 49. A. Cole, and R. Fitzpatrick, *Response to "Comment on 'Forced magnetic reconnection in the inviscid Taylor problem'"*, Phys. Plasmas **11**, 5736 (2004).
 50. K.W. Madison, P.K. Patel, M. Allen, D. Price, R., Fitzpatrick, and T. Ditmire, *Role of laser-pulse duration in the neutron yield of deuterium cluster targets*, Phys. Rev. A **70**, 053201-1-7 (2004).
 51. R. Fitzpatrick, and F.L. Waelbroeck, *Two-fluid magnetic island dynamics in slab geometry. I. Isolated islands*, Phys. Plasmas **12**, 022307 (2005).
 52. R. Fitzpatrick, and F.L. Waelbroeck, *Two-fluid magnetic island dynamics in slab geometry. II. Islands interacting with resistive walls or resonant magnetic perturbations*, Phys. Plasmas **12**, 022308 (2005).
 53. R. Fitzpatrick, P.G. Watson, and F.L. Waelbroeck, *Two-fluid magnetic island dynamics in slab geometry: Determination of the island phase velocity*, Phys. Plasmas **12**, 082510 (2005).
 54. S.C. Prager, J. Adney, A. Almagri, J. Anderson, A. Blair, D.L. Brower, M. Cengher, B.E. Chapman, S. Choi, D. Craig, S. Combs, D.R. Demers, D.J. Den Hartog, B. Deng, W.X. Ding, F. Ebrahimi, D. Ennis, G. Fiksel, R. Fitzpatrick, C. Foust, C.B. Forest, P. Franz, L. Frassinetti, J. Goetz, D. Holly, B. Hudson, M. Kaufman, T. Lovell, L. Marrelli, P. Martin, K. McCollam, V.V. Mirnov, P. Nonn, R. O'Connell, S. Oliva, P. Piovesan, I. Predebon, J.S. Sarff, G. Spizzo, V. Svidzinski, M. Thomas, E. Uchimoto, R. White, M. Wyman, *Overview of results in the MST reversed field pinch experiment*, Nucl. Fusion **45**, S276 (2005).
 55. R. Fitzpatrick, and F.L. Waelbroeck, *Effect of drift-acoustic waves on magnetic island stability in slab geometry*, Phys. Plasmas **12**, 122511 (2005).
 56. A. Cole, and R. Fitzpatrick, *Drift-magnetohydrodynamical model of error-field penetration in tokamak plasmas*, Phys. Plasmas **13**, 032503 (2006).
 57. R. Fitzpatrick, and J. Bialek, *Stability of the resistive wall mode in HBT-EP plasmas*, Phys. Plasmas **13**, 072512 (2006).
 58. R. Fitzpatrick, F.L. Waelbroeck, and F. Militello, *The influence of the ion polarization current on magnetic island stability in a tokamak plasma*, Phys. Plasmas **13**, 122507 (2006).

59. F.L. Waelbroeck, R. Fitzpatrick, and D. Grasso, *Effect of sheared flow on magnetic islands*, Phys. Plasmas **14**, 022302 (2007).
60. R. Fitzpatrick, *Effect of an error-field on the stability of the resistive wall mode*, Phys. Plasmas **14**, 022505 (2007).
61. R. Fitzpatrick, and F. Porcelli, *Erratum: Collisionless magnetic reconnection with arbitrary guide-field [Phys. Plasmas 11, 4713 (2004)]*, Phys. Plasmas **14**, 049902 (2007).
62. E.J. Strait, A.M. Garofalo, G.L. Jackson, M. Okabayashi, H. Reimerdes, M.S. Chu, R. Fitzpatrick, R.L. Groebner, Y. In, R.J. LaHaye, M.J. Lanctot, Y.Q. Liu, G.A. Navratil, W.M. Solomon, H. Takahashi, and the DIII-D Team, *Resistive wall mode stabilization by slow plasma rotation in DIII-D tokamak discharges with balanced neutral beam injection*, Phys. Plasmas **14**, 056101 (2007).
63. R. Fitzpatrick, *Interaction of scrape-off layer currents with magnetohydrodynamical instabilities in tokamak plasmas*, Phys. Plasmas **14**, 062505 (2007).
64. R. Fitzpatrick, and F.L. Waelbroeck, *Hypersonic drift-tearing magnetic islands in tokamak plasmas*, Phys. Plasmas **14**, 122502 (2007).
65. R. Fitzpatrick, and F.L. Waelbroeck, *Drift-tearing magnetic islands in tokamak plasmas*, Phys. Plasmas **15**, 012502 (2008).
66. R. Fitzpatrick, *Scaling of the peak magnetic reconnection rate in the inviscid Taylor problem*, Phys. Plasmas **15**, 024503 (2008).
67. F. Militello, F.L. Waelbroeck, and R. Fitzpatrick, *Interaction between turbulence and a nonlinear tearing mode in the low beta regime*, Phys. Plasmas **15**, 050701 (2008).
68. R. Fitzpatrick, *A sharp boundary model for the vertical and kink stability of large aspect-ratio vertically elongated tokamak plasmas*, Phys. Plasmas **15**, 092502 (2008).
69. F.L. Waelbroeck, F. Militello, R. Fitzpatrick, and W. Horton, *Effect of electrostatic turbulence on magnetic islands*, Plasma Phys. Control. Fusion **51**, 015015 (2009).
70. R. Fitzpatrick, *A simple ideal magnetohydrodynamical model of vertical disruption events in tokamaks*, Phys. Plasmas **16**, 012506 (2009).
71. R. Fitzpatrick, *Error-field induced electromagnetic torques in a large aspect-ratio, low-beta, weakly shaped tokamak plasma*, Phys. Plasmas **16**, 032502 (2009).
72. R. Fitzpatrick, and F.L. Waelbroeck, *Effect of local $E \times B$ flow shear on the stability of magnetic islands in tokamak plasmas*, Phys. Plasmas **16**, 052502 (2009).
73. R. Fitzpatrick, and F.L. Waelbroeck, *Effect of flow damping on drift-tearing magnetic islands in tokamak plasmas*, Phys. Plasmas **16**, 072507 (2009).
74. R. Fitzpatrick, *Magnetic reconnection in weakly collisional highly magnetized electron-ion plasmas*, Phys. Plasmas **17**, 042101 (2010).

75. R. Fitzpatrick, and F.L. Waelbroeck, *Locked magnetic island chains in toroidally flow damped tokamak plasmas*, Plasma Phys. Control. Fusion **52**, 055006 (2010).
76. R. Fitzpatrick, and F.L. Waelbroeck, *A drift-magnetohydrodynamical fluid model of helical magnetic island equilibria in the pedestals of H-mode tokamak plasmas*, Phys. Plasmas **17**, 062503 (2010).
77. R. Fitzpatrick, *A nonideal error-field response model for strongly shaped tokamak plasmas*, Phys. Plasmas **17**, 112502 (2010).
78. R. Fitzpatrick, *Theory of nonaxisymmetric vertical displacement events in tokamaks*, Nucl. Fusion **51**, 053007 (2011).
79. F.L. Waelbroeck, I. Joseph, E. Nardon, M. Becoulet, and R. Fitzpatrick, *Role of singular layers in the plasma response to resonant magnetic perturbations*, Nucl. Fusion **52**, 074004 (2012).
80. A. Ishizawa, F.L. Waelbroeck, R. Fitzpatrick, W. Horton, and N. Nakajima, *Magnetic island evolution in hot ion plasmas*, Phys. Plasmas **19**, 072312 (2012).
81. R. Fitzpatrick, *Nonlinear error-field penetration in low density ohmically heated tokamak plasmas*, Plasma Phys. Control. Fusion **54**, 094002 (2012).
82. R. Fitzpatrick, and F.L. Waelbroeck, *Spontaneous healing and growth of locked magnetic island chains in toroidal plasmas*, Phys. Plasmas **19**, 112501 (2012).
83. R. Fitzpatrick, *Influence of wall thickness on the stability of the resistive wall mode in tokamak plasmas*, Phys. Plasmas **20**, 012504 (2013).
84. R. Fitzpatrick, *Linear and nonlinear response of a rotating tokamak plasma to a resonant error-field*, Phys. Plasmas **21**, 092513 (2014).
85. R. Fitzpatrick, *Influence of ferromagnetic walls on resistive wall mode stability in tokamaks*, Plasma Phys. Control. Fusion **56**, 105002 (2014).
86. R. Fitzpatrick, *Phase locking of multi-helicity neoclassical tearing modes in tokamak plasmas*, Phys. Plasmas **22**, 042514 (2015).
87. R. Fitzpatrick, *Braking of tearing mode rotation by ferromagnetic conducting walls in tokamaks*, Phys. Plasmas **22**, 092506 (2015).
88. R.L. White, and R. Fitzpatrick, *Effect of rotation and velocity shear on tearing layer stability in tokamak plasmas*, Phys. Plasmas **22**, 102507 (2015).
89. B. Tobias, M. Chen, I.G.J. Classen, C.W. Domier, R. Fitzpatrick, B.A. Grierson, N.C. Luhmann Jr, C.M. Muscatello, M. Okabayashi, K.E.J. Olofsson, and C. Paz-Soldan, *Rotation profile flattening and toroidal flow shear reversal due to the coupling of magnetic islands in tokamaks*, Phys. Plasmas **23**, 056107 (2016).
90. R. Fitzpatrick, *An improved neoclassical drift-magnetohydrodynamical fluid model of helical magnetic island equilibria in tokamak plasmas*, Phys. Plasmas **23**, 052506 (2016).

91. R. Fitzpatrick, *Helical temperature perturbations associated with radially asymmetric magnetic island chains in tokamak plasmas*, Phys. Plasmas **23**, 122502 (2016).
92. R. Fitzpatrick, *Effect of nonlinear energy transport on neoclassical tearing mode stability in tokamak plasmas*, Phys. Plasmas **24**, 052504 (2017).
93. R. Fitzpatrick, *Determination of the non-ideal response of a high temperature tokamak plasma to a static external magnetic perturbation via asymptotic matching*, Phys. Plasmas **24**, 072506 (2017).
94. R. Fitzpatrick, *Interaction of a magnetic island chain in a tokamak plasma with a resonant magnetic perturbation of rapidly oscillating phase*, Phys. Plasmas **24**, 122506 (2017).
95. D.J. Rhodes, A.J. Cole, D.P. Brennan, J.M. Finn, M. Li, R. Fitzpatrick, M.E. Mauel, and G.A. Navratil, *Shaping effects on toroidal magnetohydrodynamic modes in the presence of plasma and wall resistivity*, Phys. Plasmas **25**, 012517 (2018).
96. R. Fitzpatrick, *A neoclassical drift-magnetohydrodynamical fluid model of the interaction of a magnetic island chain with a resonant error-field in a high temperature tokamak plasma*, Phys. Plasmas **25**, 042503 (2018).
97. R. Fitzpatrick, *Nonlinear neoclassical two-fluid theory of response of tokamak plasma to resonant error-field*, Phys. Plasmas **25**, 082513 (2018).
98. R. Fitzpatrick, *Two-fluid nonlinear theory of response of tokamak plasma to resonant magnetic perturbation*, Phys. Plasmas **25**, 112505 (2018).
99. T. Xu, and R. Fitzpatrick, *Vacuum solution for Solov'ev's equilibrium configuration in tokamaks*, Nucl. Fusion **59**, 112505 (2019).
100. R. Fitzpatrick, *Theory of edge localized mode suppression by static resonant perturbations in the DIII-D tokamak*, Phys. Plasmas **27**, 042506 (2020).
101. R. Fitzpatrick, *An improved theory of the response of DIII-D H-mode discharges to static resonant magnetic perturbations and its implications for the suppression of edge localized modes*, Phys. Plasmas **27**, 072501 (2020).
102. R. Fitzpatrick, *Modeling q_{95} windows for the suppression of edge localized modes by resonant magnetic perturbations in the DIII-D tokamak*, Phys. Plasmas **27**, 102511 (2020).

Books:

1. *Euclid's Elements* (Lulu, 2007) ISBN: 978-061-517-984-1.

An edition of Euclid's Elements of Geometry consisting of the definitive Greek text of J.L. Heiberg (1883-1885) accompanied by a modern English translation and a Greek-English lexicon.

2. *Maxwell's Equations and the Principles of Electromagnetism* (Infinity Science Press, Jones & Bartlett Learning, 2008) ISBN: 978-193-401-520-9.

A textbook aimed at upper-division physics majors.

3. *An Introduction to Celestial Mechanics* (Cambridge, 2012) ISBN: 978-110-702-381-9.

A textbook aimed at upper-division physics and astronomy majors.

4. *Oscillations and Waves: An Introduction* (CRC Press, 2013) ISBN: 978-146-656-608-8.

A textbook aimed at lower-division physics majors.

5. *Plasma Physics: An Introduction* (CRC Press, 2014) ISBN: 978-146-659-426-5.

A textbook aimed at physics graduate students.

6. *Quantum Mechanics* (World Scientific, 2015) ISBN: 978-981-468-994-6.

A textbook aimed at physics graduate students.

7. *Theoretical Fluid Mechanics* (Institute of Physics, 2017) ISBN: 978-075-031-552-4.

A textbook aimed at physics graduate students.

8. *Oscillations and Waves: An Introduction, 2nd Edition* (CRC Press, 2019) ISBN: 978-113-848-035-3.

A textbook aimed at lower-division physics majors.

9. *Thermodynamics and Statistical Mechanics* (World Scientific, 2020) ISBN: 978-981-122-335-8.

A textbook aimed at upper-division physics majors.