

Publications of Kirk T. McDonald

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(April 4, 2018)

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1101. *Hexagonal Pencil Rolling on an Inclined Plane* (Nov. 14, 2006),
<http://physics.princeton.edu/~mcdonald/examples/pencil.pdf>
1102. (with J.L. Junquera) *Galilean Transformation of Wave Velocity* (Jan. 14, 2007),
http://physics.princeton.edu/~mcdonald/examples/wave_velocity.pdf
1103. *Stabilization of Insect Flight via Sensors of Coriolis Force* (Feb. 17, 2007),
<http://physics.princeton.edu/~mcdonald/examples/stabilization.pdf>
1104. *Permeable Shell in a Uniform External Field* (Feb. 24, 2007),
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1108. (with S. Palestini) *Space Charge in Ionization Detectors* (Mar. 25, 2007),
<http://physics.princeton.edu/~mcdonald/examples/spacecharge.pdf>
1109. *Flow of Energy and Momentum in a Coaxial Cable* (Mar. 31, 2007),
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<http://physics.princeton.edu/~mcdonald/examples/ladder.pdf>
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<http://physics.princeton.edu/~mcdonald/examples/guitar.pdf>
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<http://physics.princeton.edu/~mcdonald/examples/receiver.pdf>
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<http://physics.princeton.edu/~mcdonald/examples/transmitter.pdf>
1114. *Tokyo Drift* (Oct. 7, 2007),
http://physics.princeton.edu/~mcdonald/examples/tokyo_drift.pdf

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http://physics.princeton.edu/~mcdonald/examples/belt_drive.pdf
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1120. *Thermodynamics of a Tire Pump* (Nov. 29, 2007),
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1122. *Electron Trajectories in a Hall Thruster* (Feb. 27, 2008),
<http://physics.princeton.edu/~mcdonald/examples/thruster.pdf>
1123. *The Velocity Factor of an Insulated Two-Wire Transmission Line* (Mar. 6, 2008),
http://physics.princeton.edu/~mcdonald/examples/velocity_factor.pdf
1124. *What Does an AC Voltmeter Measure?* (Mar. 16, 2008),
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1125. *Static-Voltage Gauge* (Mar. 25, 2008),
http://physics.princeton.edu/~mcdonald/examples/static_gauge.pdf
1126. *The Helmholtz Decomposition and the Coulomb Gauge* (Apr. 17, 2008),
<http://physics.princeton.edu/~mcdonald/examples/helmholtz.pdf>
1127. (with J. Castro) *Magnetic Field at the Origin of a Grounded, Conducting Sphere Circled by a Moving Charge Q* (June 26, 2008),
<http://physics.princeton.edu/~mcdonald/examples/rotatingcharge.pdf>
1128. *The Wilson-Wilson Experiment* (July 30, 2008),
<http://physics.princeton.edu/~mcdonald/examples/wilson.pdf>
1129. *Electrodynamics of Rotating Systems* (Aug. 6, 2008),
<http://physics.princeton.edu/~mcdonald/examples/rotatingEM.pdf>
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<http://physics.princeton.edu/~mcdonald/examples/turnstile.pdf>
1134. *Can Dipole Antennas Above a Ground Plane Emit Circularly Polarized Radiation?*
(Sep. 19, 2008), <http://physics.princeton.edu/~mcdonald/examples/groundplane.pdf>
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1137. *Classical Diamagnetism and the Satellite Paradox* (Nov. 12, 2008),
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1140. *Charging a Capacitor via a Transient RLC Circuit* (Mar. 6, 2009),
<http://physics.princeton.edu/~mcdonald/examples/seriesrlc.pdf>
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1143. (with M. Moriconi) *Energy Flow in a Waveguide below Cutoff* (May 20, 2009),
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1144. *Reactance of Small Antennas* (June 3, 2009),
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1145. *Total and Frustrated Reflection of a Gaussian Optical Beam*, (July 7, 2009),
<http://physics.princeton.edu/~mcdonald/examples/internal.pdf>
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http://physics.princeton.edu/~mcdonald/examples/davis_psi2.pdf

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1156. *Power Received by a Small Antenna*, (Dec. 1, 2009),
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1157. *Radiation from the Open End of a Coaxial Cable*, (Dec. 2, 2009),
http://physics.princeton.edu/~mcdonald/examples/coax_rad.pdf
1158. (with C.G. Tully) *Spinning Lasso*, (Dec. 11, 2009),
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1159. *Accelerating Through a Resonance on a "Washboard" Road*, (Dec. 13, 2009),
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1161. *An Antenna Reciprocity Theorem* (Apr. 3, 2010),
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1162. *Can Sheared Surfaces Emit Light?* (Apr. 9, 2010),
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1167. *Does the Moon Always Fall Towards the Sun?* (June 9, 2010),
<http://physics.princeton.edu/~mcdonald/examples/moonfall.pdf>
1168. *Blondel's Experiment* (June 11, 2010),
<http://physics.princeton.edu/~mcdonald/examples/blondel.pdf>
1169. *Displacement Current of a Uniformly Moving Charge* (June 15, 2010),
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1171. *Decomposition of Electromagnetic Fields into Electromagnetic Plane Waves* (July 11, 2010), <http://physics.princeton.edu/~mcdonald/examples/virtual.pdf>
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1173. *Radiation by a Time-Dependent Current Loop* (Sept. 26, 2010),
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1174. *Čerenkov Radiation from a Short Path* (Oct. 5, 2010),
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1175. *Reactance of a Sinusoidally Driven Antenna* (Nov. 15, 2010),
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1176. *Charge Density in a Current-Carrying Wire* (Dec. 23, 2010),
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1177. *Potentials for a Rectangular Electromagnetic Cavity* (Mar. 4, 2011),
<http://physics.princeton.edu/~mcdonald/examples/cavity.pdf>
1178. *Poincaré Potential for a Finite Solenoid* (Mar. 8, 2011),
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1181. *Static Magnetic Field as Determined by Its Value on a Surface* (Mar. 17, 2011), <http://physics.princeton.edu/~mcdonald/examples/surface.pdf>
1182. *Hamiltonian with z as the Independent Variable* (Mar. 19, 2011), <http://physics.princeton.edu/~mcdonald/examples/hamiltonian.pdf>
1183. *Emittance Growth from Weak Relativistic Effects* (Mar. 21, 2011), <http://physics.princeton.edu/~mcdonald/examples/growth.pdf>
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1186. *Ball-Bearing Motor* (May 17, 2011), <http://physics.princeton.edu/~mcdonald/examples/motor.pdf>
1187. *The Equivalence Principle and Roundtrip Times for Light* (May 25, 2011), <http://physics.princeton.edu/~mcdonald/examples/accel.pdf>
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1189. *Excitation of a Rectangular Electromagnetic Cavity by a Passing, Relativistic Particle* (June 29, 2011), <http://physics.princeton.edu/~mcdonald/examples/excitation.pdf>
1190. *Power Consumption in a Pulsed Copper Magnet* (July 16, 2011), <http://physics.princeton.edu/~mcdonald/examples/pulsed.pdf>
1191. *Information Channel Capacity* (July 23, 2011), <http://physics.princeton.edu/~mcdonald/examples/shannon.pdf>
1192. *Force-Free Magnetic Fields aka Eigenfunctions of the Curl Operator* (Aug. 10, 2011), <http://physics.princeton.edu/~mcdonald/examples/forcefree.pdf>
1193. *Wire Polarizers* (Sep. 21, 2011), <http://physics.princeton.edu/~mcdonald/examples/polarizer.pdf>
1194. *Scattering of a Plane Electromagnetic Wave by a Small Conducting Cylinder* (Oct. 4, 2011), http://physics.princeton.edu/~mcdonald/examples/small_cylinder.pdf

1195. *Box Toss* (Oct. 17, 2011),
http://physics.princeton.edu/~mcdonald/examples/box_toss.pdf
1196. *Wagon in the Rain* (Oct. 22, 2011),
<http://physics.princeton.edu/~mcdonald/examples/wagon.pdf>
1197. *Perfectly Conducting Cylinder in an External, Static Magnetic Field* (Oct. 29, 2011),
http://physics.princeton.edu/~mcdonald/examples/perfect_cylinder.pdf
1198. *Small Oscillations of a Mass That Slides inside a Cylinder Which Rotates about a Horizontal Axis* (Nov. 1, 2011),
<http://physics.princeton.edu/~mcdonald/examples/sliding.pdf>
1199. *Resistive Cylinder in an External, Static Magnetic Field* (Nov. 2, 2011),
http://physics.princeton.edu/~mcdonald/examples/resistive_cylinder.pdf
1200. *Slingshot Ride* (Nov. 13, 2011),
http://physics.princeton.edu/~mcdonald/examples/slingshot_ride.pdf
1201. *Energy Flow in a Transformer* (Nov. 15, 2011),
<http://physics.princeton.edu/~mcdonald/examples/transformer.pdf>
1202. (with V. Hnizdo) *Fields and Moments of a Moving Electric Dipole* (Nov. 29, 2011),
<http://physics.princeton.edu/~mcdonald/examples/movingdipole.pdf>
1203. *What is the Role of the Arms of a Linear Broadcast Antenna?* (Dec. 19, 2011),
<http://physics.princeton.edu/~mcdonald/examples/arms.pdf>
1204. *A Gentler Loop-the-Loop* (Jan. 7, 2012),
<http://physics.princeton.edu/~mcdonald/examples/looptheloop.pdf>
1205. (with Z.M. Tan) *Symmetries of Electromagnetic Fields Associated with a Plane Conducting Screen* (Jan. 14, 2012),
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1206. (with Z.M. Tan) *Babinet's Principle for Electromagnetic Fields* (Jan. 19, 2012),
<http://physics.princeton.edu/~mcdonald/examples/babinet.pdf>
1207. *Sommerfeld's Diffraction Problem* (Jan. 22, 2012),
<http://physics.princeton.edu/~mcdonald/examples/sommerfeld.pdf>
1208. *Motion of a Pair of Oppositely Charged Spheres* (Feb. 3, 2012),
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1209. *Circuit Q and Field Energy* (Apr. 1, 2012),
http://physics.princeton.edu/~mcdonald/examples/q_rlc.pdf
1210. *Magnetic Damping* (Apr. 14, 2012),
<http://physics.princeton.edu/~mcdonald/examples/eddy.pdf>

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<http://physics.princeton.edu/~mcdonald/examples/mansuripur.pdf>
1212. *Maxwellian Vacuum Polarization* (June 2, 2012),
<http://physics.princeton.edu/~mcdonald/examples/polarization.pdf>
1213. *Abraham, Minkowski and "Hidden" Mechanical Momentum* (June 6, 2012),
<http://physics.princeton.edu/~mcdonald/examples/abraham.pdf>
1214. *"Hidden" Momentum in an Oscillating Tube of Water* (June 24, 2012),
<http://physics.princeton.edu/~mcdonald/examples/utube.pdf>
1215. *"Hidden" Momentum in a Link of a Moving Chain* (June 28, 2012),
<http://physics.princeton.edu/~mcdonald/examples/link.pdf>
1216. *"Hidden" Momentum in a Set of Circulating Rockets* (June 29, 2012),
<http://physics.princeton.edu/~mcdonald/examples/rockets.pdf>
1217. *"Hidden" Momentum in a Current Loop* (June 30, 2012),
<http://physics.princeton.edu/~mcdonald/examples/penfield.pdf>
1218. *"Hidden" Momentum in a River* (July 5, 2012),
<http://physics.princeton.edu/~mcdonald/examples/river.pdf>
1219. *"Hidden" Momentum in a Plane Electromagnetic Wave* (July 7, 2012),
<http://physics.princeton.edu/~mcdonald/examples/planewave.pdf>
1220. *"Hidden" Momentum in an Oscillating Spring* (July 8, 2012),
<http://physics.princeton.edu/~mcdonald/examples/spring.pdf>
1221. *On the Definition of "Hidden" Momentum* (July 9, 2012),
<http://physics.princeton.edu/~mcdonald/examples/hiddendef.pdf>
1222. *"Hidden" Momentum in a Spinning Sphere* (Aug. 16, 2012),
<http://physics.princeton.edu/~mcdonald/examples/spinningsphere.pdf>
1223. *"Hidden" Momentum in a Linked Pair of Gyrostats* (Aug. 17, 2012),
<http://physics.princeton.edu/~mcdonald/examples/gyrostat.pdf>
1224. *Potentials of a Hertzian Dipole in the Gibbs Gauge* (Aug. 23, 2012),
<http://physics.princeton.edu/~mcdonald/examples/gibbs.pdf>
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<http://physics.princeton.edu/~mcdonald/examples/hoop.pdf>
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1393. *Ph205 Problem Set 3*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set3.pdf>
1394. *Ph205 Problem Set 4*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set4.pdf>
1395. *Ph205 Problem Set 5*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set5.pdf>
1396. *Ph205 Problem Set 6*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set6.pdf>
1397. *Ph205 Problem Set 7*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set7.pdf>
1398. *Ph205 Problem Set 8*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set8.pdf>
1399. *Ph205 Problem Set 9*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set9.pdf>
1400. *Ph205 Problem Set 10*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set10.pdf>
1401. *Ph205 Problem Set 11*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set11.pdf>
1402. *Ph205 Problem Set 12*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205set12.pdf>
1403. *Ph205 Final exam 1981*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205final81.pdf>
1404. *Ph205 Final exam 1983*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205final83.pdf>
1405. *Ph205 Final exam 1989*,
<http://physics.princeton.edu/~mcdonald/examples/Ph205/ph205final89.pdf>

Ph304: Advanced Electromagnetism

1406. *Ph304 Problem Set 1*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set1.pdf>

1407. *Ph304 Problem Set 2*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set2.pdf>
1408. *Ph304 Problem Set 3*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set3.pdf>
1409. *Ph304 Problem Set 4*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set4.pdf>
1410. *Ph304 Problem Set 5*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set6.pdf>
1411. *Ph304 Problem Set 6*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set7.pdf>
1412. *Ph304 Problem Set 7*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set8.pdf>
1413. *Ph304 Problem Set 8*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set9.pdf>
1414. *Ph304 Problem Set 9*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set10.pdf>
1415. *Ph304 Problem Set 10*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set11.pdf>
1416. *Ph304 Problem Set 11*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set12.pdf>
1417. *Ph304 Problem Set 12*,
<http://physics.princeton.edu/~mcdonald/examples/ph304set1.pdf>
1418. *Ph304 Midterm Exam (2002)*,
<http://physics.princeton.edu/~mcdonald/examples/ph304midterm02.pdf>
1419. *Ph304 Midterm Exam (2003)*,
<http://physics.princeton.edu/~mcdonald/examples/ph304midterm03.pdf>
1420. *Ph304 Final Exam (2002)*,
<http://physics.princeton.edu/~mcdonald/examples/ph304final02.pdf>
1421. *Ph304 Final Exam (2003)*,
<http://physics.princeton.edu/~mcdonald/examples/ph304final03.pdf>

Ph308: Quantum Mechanics

1422. *Notes on Fermi's Golden Rule* (Oct. 6, 2013),
http://physics.princeton.edu/~mcdonald/examples/golden_rule_101613.pdf

Ph406: Nuclear and Elementary Particle Physics

1423. *Ph406 Problem Set 1* (Feb. 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set1.pdf
1424. *Ph406 Problem Set 2* (Feb. 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set2.pdf
1425. *Ph406 Problem Set 3* (Feb. 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set3.pdf
1426. *Ph406 Problem Set 4* (Mar. 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set4.pdf
1427. *Ph406 Problem Set 5* (Mar. 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set5.pdf
1428. *Ph406 Problem Set 6* (Mar. 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set6.pdf
1429. *Ph406 Problem Set 7* (April 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set7.pdf
1430. *Ph406 Problem Set 8* (April 1992 and 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set8.pdf
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set8_93.pdf
1431. *Ph406 Problem Set 9* (April 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set9.pdf
1432. *Ph406 Problem Set 10* (March 1993),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set10.pdf
1433. *Ph406 Final Exam* (May 1992),
http://physics.princeton.edu/~mcdonald/examples/ph405ph406_final.pdf
http://physics.princeton.edu/~mcdonald/examples/ph405ph406_final_sol.pdf
1434. *Ph406 Problem Set 1* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set1_2014_sol.pdf
1435. *Ph406 Problem Set 2* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set2_2014_sol.pdf

1436. *Ph406 Problem Set 3* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set3_2014_sol.pdf
1437. *Ph406 Problem Set 4* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set4_2014_sol.pdf
1438. *Ph406 Problem Set 5* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set5_2014_sol.pdf
1439. *Ph406 Problem Set 6* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set6_2014_sol.pdf
1440. *Ph406 Problem Set 7* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set7_2014_sol.pdf
1441. *Ph406 Problem Set 8* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set8_2014_sol.pdf
1442. *Ph406 Problem Set 9* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set9_2014_sol.pdf
1443. *Ph406 Problem Set 10* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set10_2014_sol.pdf
1444. *Ph406 Problem Set 11* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set11_2014_sol.pdf
1445. *Ph406 Problem Set 12* (2014),
http://physics.princeton.edu/~mcdonald/examples/ph406/ph406_set12_2014_sol.pdf

Ph410: Physics of Quantum Computation

1446. *Problem Sets (2005-2006)*,
<http://physics.princeton.edu/~mcdonald/examples/ph410problems.pdf>
1447. *Reflections of a (Skeptical) Experimental High-Energy Physicist after Teaching a Course on Quantum Computation* (Feb. 24, 2006),
<http://physics.princeton.edu/~mcdonald/examples/QMtrans1.pdf>

Ph501: Electricity and Magnetism

1448. *Ph501 Lecture 1: Overview of Maxwell's Equations; Electrostatics*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture1.pdf>
1449. *Ph501 Lecture 2: Conductors and Dielectrics*,
<http://physics.princeton.edu/~mcdonald/examples/ph501ph501lecture2.pdf>

1450. *Ph501 Lecture 3: Electrostatic Energy, Maxwell Stress Tensor,*
<http://physics.princeton.edu/~mcdonald/examples/ph501ph501lecture3.pdf>
1451. *Ph501 Lecture 4: Potential Theory: Image Methods, 2-D Problems with Rectangular Boundaries,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture4.pdf>
1452. *Ph501 Lecture 5: Potential Theory: 2-D Problems with Cylindrical and Spherical Boundaries,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture5.pdf>
1453. *Ph501 Lecture 6: Potential Theory: 3-D Problems with Cylindrical Boundaries; Conducting Needles, Spheroids, Disks; Use of Conjugate Functions,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture6.pdf>
1454. *Ph501 Lecture 7: Steady Currents; Magnetostatics,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture7.pdf>
1455. *Ph501 Lecture 8: Sources of the Magnetic field; Magnetic Materials,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture8.pdf>
1456. *Ph501 Lecture 9: Faraday's Law,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture9.pdf>
1457. *Ph501 Lecture 10: Electromagnetic Energy, Momentum and Angular Momentum; Inductance,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture10.pdf>
1458. *Ph501 Lecture 11: Introduction to Electromagnetic Waves,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture11.pdf>
1459. *Ph501 Lecture 12: Plane Waves in Dielectric Media,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture12.pdf>
1460. *Ph501 Lecture 13: Plane Waves in Conducting Media,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture13.pdf>
1461. *Ph501 Lecture 14: Waves in Boxes and Pipes,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture14.pdf>
1462. *Ph501 Lecture 15: Sources of the Waves – The Retarded Potentials,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture15.pdf>
1463. *Ph501 Lecture 16: Multipole Radiation; Antennas; Scattering,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture16.pdf>
1464. *Ph501 Lecture 17: Optics and Diffraction; Gaussian Laser Beams,*
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture17.pdf>

1465. *Ph501 Lecture 18: Special Relativity; The 4-Potential of a Moving Charge*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture18.pdf>
1466. *Ph501 Lecture 19: Other Force Fields; Significance of Gauge Invariance; Fields of a Moving Charge*,
<http://physics.princeton.edu/~mcdonald/examples/ph501ph501lecture19.pdf>
1467. *Ph501 Lecture 20: Relativistic Radiation Effects: Bremsstrahlung, Synchrotron Radiation*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture20.pdf>
1468. *Ph501 Lecture 21: Relativistic Radiation Effects: Čerenkov Radiation, Transition Radiation*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture21.pdf>
1469. *Ph501 Lecture 22: Electromagnetic Mass; Radiation Reaction*,
<http://physics.princeton.edu/~mcdonald/examples/ph501ph501lecture22.pdf>
1470. *Ph501 Lecture 23: Interaction of Radiation with Matter – Microscopic View*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture23.pdf>
1471. *Ph501 Lecture 24: Mechanics and Electromagnetism*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture24.pdf>
1472. *Ph501 Lecture 25: Lasers from a Classical Perspective*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture25.pdf>
1473. *Ph501 Lecture 26: Solitons*,
<http://physics.princeton.edu/~mcdonald/examples/ph501/ph501lecture26.pdf>
1474. *Ph501 Problem Set 1*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set1.pdf>
1475. *Ph501 Problem Set 2*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set2.pdf>
1476. *Ph501 Problem Set 3*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set3.pdf>
1477. *Ph501 Problem Set 4*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set4.pdf>
1478. *Ph501 Problem Set 5*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set5.pdf>
1479. *Ph501 Problem Set 6*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set6.pdf>

1480. *Ph501 Problem Set 7*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set7.pdf>
1481. *Ph501 Problem Set 8*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set8.pdf>
1482. *Ph501 Problem Set 9*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set9.pdf>
1483. *Ph501 Problem Set 10*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set10.pdf>
1484. *Ph501 Problem Set 11*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set11.pdf>
1485. *Ph501 Problem Set 12*,
<http://physics.princeton.edu/~mcdonald/examples/ph501set12.pdf>
1486. *Ph501 Midterm Exam (October 2000)*,
http://physics.princeton.edu/~mcdonald/examples/ph501midterm_102300.pdf

Physics 529: Elementary Particle Physics

These lectures, written in the 1980's, give a sense of how the Standard Model came to be.

1487. *Ph529 Lecture 1: Why High Energy?*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52911.pdf>
1488. *Ph529 Lecture 2: History: The Strong Interaction*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52912.pdf>
1489. *Ph529 Lecture 3: History: Electromagnetic and Weak Interactions*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52913.pdf>
1490. *Ph529 Lecture 4: Detecting Elementary Particles*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52914.pdf>
1491. *Ph529 Lecture 5: The Electromagnetic Structure of Matter*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52915.pdf>
1492. *Ph529 Lecture 6: Elastic Scatterin fo Electrons and Hadrons*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52916.pdf>
1493. *Ph529 Lecture 7: Elastic Scatterin fo Electrons and Hadrons, II*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52917.pdf>
1494. *Ph529 Lecture 8: Inetastic Electron Scattering*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52918.pdf>

1495. *Ph529 Lecture 9: Invariance Principles and Conservation Laws*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52919.pdf>
1496. *Ph529 Lecture 10: Charge Conjugation, Isospin, etc.*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529110.pdf>
1497. *Ph529 Lecture 11: 3-Body Decays, Partial-Wave Analysis*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529111.pdf>
1498. *Ph529 Lecture 12: Phenomenology of the Strong Interaction at High Energies*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529112.pdf>
1499. *Ph529 Lecture 13: The Quark Model*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529113.pdf>
1500. *Ph529 Lecture 14: The Quark Model, II*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529114.pdf>
1501. *Ph529 Lecture 15: Heavy Quark States*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529115.pdf>
1502. *Ph529 Lecture 16: The Weak Interaction*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529116.pdf>
1503. *Ph529 Lecture 17: Weak Interactions, II*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529117.pdf>
1504. *Ph529 Lecture 18: CP Violation*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529118.pdf>
1505. *Ph529 Lecture 19: Neutrino Interactions*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529119.pdf>
1506. *Ph529 Lecture 20: The Need for a Better Theory*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529120.pdf>
1507. *Ph529 Lecture 21: The Glashow-Weinberg-Salam Model*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529121.pdf>
1508. *Ph529 Lecture 22: Test of the Glashow-Salam-Weinberg Model*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529122.pdf>
1509. *Ph529 Lecture 23: Quantum Chromodynamics*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph52923.pdf>
1510. *Ph529 Lecture 24: Speculations*
<http://physics.princeton.edu/~mcdonald/examples/ph529/ph529124.pdf>

Short Course on Astroparticle Physics (1988)

- 1511. *Lecture 1. Techniques of Astroparticle Physics*,
<http://physics.princeton.edu/~mcdonald/papers/schladming1.pdf>
- 1512. *Lecture 2. Gamma-Ray Protons and Photons*,
<http://physics.princeton.edu/~mcdonald/papers/schladming2.pdf>
- 1513. *Lecture 3. Solar and Supernova Neutrinos*,
<http://physics.princeton.edu/~mcdonald/papers/schladming3.pdf>
- 1514. *Lecture 4. Detectors for the Rest of the Universe*,
<http://physics.princeton.edu/~mcdonald/papers/schladming4.pdf>

Short Courses on Accelerator Physics

- 1515. *A Short Course on Targetry for a Neutrino Factory and Muon Collider* (June 4, 2003)
<http://physics.princeton.edu/~mcdonald/mumu/target/targettrans38.pdf>
- 1516. *A Short Course on Targetry for Neutrino Superbeams, Neutrino Factories and Muon Colliders* (NuFACT06 Summer Institute, Aug 21, 2006),
<http://physics.princeton.edu/~mcdonald/mumu/target/targettrans53.pdf>