

Physics 511
“Conceptual” Syllabus – Spring 2018
(the dates may slide; we are not in a rush)
Professor David Hertzog

Date	Day	Physics Topic	Paper**	Lead / Guest	Additional	Due*
3/26	T	Neutron lifetime, “ τ_n ”, and the controversy	Pattie; Bottle	Hertzog +		
3/28	Th	Neutron lifetime, “ τ_n ”, beams/bottles compared	Yue; Beam Discuss differences / impact	Hertzog	Accuracy, Precision & Systematic Errors!	Sign up for leads
4/3	T	Gravitational constant, “Big G” (gravity)	Schlaminter Beam Balance	L: Hertzog G: Charlie		
4/5	Th	Big G continued, and Weak Equiv Principle	Gundlach Big G / Torsion Schlamminger, WEP /Torsion	L: Hertzog G: Charlie		
4/10	T	No Class / longer on Thursday				
4/12	Th	Fine-structure constant “ α_{em} ”(electromagnetism)	Odem 2006; Hanneke 2008 quantum jump spectroscopy	L: Hertzog G: Elise	2 hr class	Title/abstract in PRL or NIM style for your work
4/17	T	Parity Violation (conjecture and proof)	Lee & Yang 1956 Wu 1957; Garwin 1957	L: Hannah	(JH at APS)	
4/19	Th	Fermi constant “ G_F ” (weak interaction)	Webber 2011; pulsed beam	L: Lukas		2 Figures with captions
4/24	T	Neutrinos oscillation SNO Papers	JellyMcDonaldRobertson Ann Rev 2009	L: Khang		
4/26	Th	Neutrinos oscillation KAMLAND Papers	Abe et al 2008, but look at previous Aharmin and Ahmad	L: Jason		Write an Intro section with motivation, etc.
5/1	T	EDM 1: neutron	Baker et al: nEDM at ILL	L: Raphael		
5/3	Th	EDM 2: Hg-199	Graner et al: Hg-99 effort	L: Brynn		Write a procedure section
5/8	T	KATRIN and	tbd	L: Khang		

5/10	Th	Project 8	Asner: Project 8 technique	L: Lukas		Findings
5/15	T	LIGO Experiment	Abbott LIGO (discovery) Aasi et al (is the instrument)	L: Jason		
5/17	Th	Proton charge radius Muonic Lamb shift	Antognini et al (plus supplemental stuff I have)	L: Raphael		Putting it all together V1
5/22	T	Axion dark matter	Du et al: ADMX	L: Brynn		
5/24	Th	WIMP dark matter	TBD	L: Jason		
5/29	T	Muon g-2	Bennett et al	L: Dave	(or volunteer)	
5/31	Th	Muon lepton flavor violation	MEG collaboration	L: Dave	(or volunteer)	

* Assignments are meant to focus on your present work. Do not draw on anything already published. Make it new and personal.

** First author listed; most have multiple authors