

COSMOLOGY INTEREST GROUP NOTES - TOC

Gary Evans

v.01-21-2025

Meeting	Note	Last Released	Description (link)
-----	0	07/23/21	TOC – Meeting Topics
06/16/17	1a	06/30/17	1st Meeting: Introductions, Dark Matter, Anisotropy, Large-Scale, Timeline
	1b	02/27/24	Timeline of the Universe , Cosmological Constant , Multiuniverse Theory
	1c	--	Ryden’s Introduction to Cosmology / Yu’s Introduction to Cosmology
	1d	03/21/19	Pythagorean Derivation of Time Variable
	99e	09/21/21	Special Theory of Relativity Calculations
	--	--	Didier: Recalling Georges Lemaitre; CMB E- and B-mode Polarizations
06/23/17	--	--	Epochs, CMB size over time, cosmological constant, Multiuniverse theory
06/30/17	--	--	Didier’s presentation: Georges Lemaitre, CMB-E and -B mode polariz.
07/02/17	2	07/07/17	Inflation; Matter–Antimatter Asymmetry; Gauge Groups, 10¹⁶ GeV Unif.
08/25/17	3a	08/25/17	Miscellaneous Questions to Consider
	3b	07/22/17	Wien’s Displacement Law Proof
	3c	03/29/19	Energy to Ionize Hydrogen Calculation
	3d	07/17/17	CMB Peak Frequency at CMB LSS Calculation
	3e	08/08/17	Summary: CMB BAO
	3f	12/28/19	Penzias and Wilson 1965 “Excess Noise” publication (pub w/ below)
	3f1	12/28/19	Wilkinson Group’s 1965 “Cosmic Blackbody Radiation” (pub. w/ above)
	3g	08/30/17	Forces and Fields Summary
06/28/19	4a	06/28/19	Email: Plans Restart with De Rujula’s Book “Enjoy Our Universe”
	4b	04/06/20	Matter – Antimatter Asymmetry
07/26/19	5a	07/25/19	Misc. Questions: Hubble Const, GWs, Supernovae, BHs and SMBHs
	5b	17-31-17a	Deriving the Photon:Nucleon Ratio (and Photon:Baryon Ratio)
	5c	07-10-19	From Art: SMBHs May Constrain Superlight Dark Matter
08/23/19	6a	08/14/19	Summary of Scientific American 2019 – Extreme Physics
	6b	08/20/19	The Hubble Constant
	6c	--	SciAm Article: The Hubble Constant
	6d	08/20/19	Hubble constant (cont.), Dark Matter candidates, Planck scale
	6e	--	Higgs Mechanism (Nobel Prize)
09/27/19	7a	--	High Redshift Quasars – “How did they get there?”
	7b	--	Discussions: PBHs; fundamental forces, Axions , Neutrino handedness
	7c	09/27/19	Permittivity, Permissivity and the speed of light
10/25/19	8	10/25/19	Hubble Constant (Marc’s meeting report); Axions; Dark Matter, SMBH
12/06/19	9a	12/01/19	Discussions: Is the Universe finite? Evol. of the Univ.; Our existence!
	9b	12/01/19	Axion Particles and Observational Experiments
	9c	12/04/19	Gravitational Wave Astronomy – A Summary
	9d	12/01/19	Gravitational Wave Observatories
01/03/20	10a	12/27/19	Summary – The First Three Minutes (from 7/26/17)
	10b	12/27/19	Summary – The First Three Minutes (from 12/27/19)

	10c	12/26/19	Questions – The First Three Minutes (1993 version)
	10d	12/27/19	Big Bang Nucleosynthesis
	10e	??	Notes – CMB and Nucleogenesis
	10f	11/09/09	UCB Segre Lecture 11/09/09: Andrew Lang “How Did the Univ. Begin?”
02/07/20	11a	02/06/20	Baryonic Acoustic Oscillations of the CMB
	11b	07/25/15	Student Friendly Guide to the CMB
04/03/20	12a	03/10/20	Inflationary Cosmology – Part 1 (sections: 1 , 2 , 3 , 4 , 5) / Word for Printing
	12b	04/03/20	Inflationary Cosmology – Part 2
	12c	07/07/17	Notes – Guth’s Book - Inflationary Universe
	12d		QM and GR Contradictions (Interpretation online)
05/15/20	13a	05/13/20	Stellar Formation and Large-Scale Structures
	13b	05/15/20	Questions for the May 15, 2020 Meeting
	13c	05/15/20	Particle Degeneracy
06/19/20		06/19/20	Marc’s Slide Presentation: Large scale structure, spiral galaxies.
07/31/20		--	SMBH in the Early Universe; Spiral Galaxies
09/05/20		--	SMBH continued
10/02/20	14a	09/04/20	SMBH and Spiral Galaxies (continued)
	14b	10/02/20	Gravitational Wave Signals – Part 1
	14c	10/02/20	Observing a Wider Scale of the Gravitational Wave Spectrum
	14d	--	GW Detection Tests of General Relativity (article)
	14e	--	Pulsar Timing Arrays (article)
		09/05/20	A \$300 Radio telescope
11/06/20	15a	11/07/20	Gravitational Wave Signals – Part 2
	15b	11/06/20	Addenda and Questions for the Meeting
	15c	--	Cosmic-Explorer-Conference-10-2020-Notes
12/04/20	16a	12/04/20	B-Mode Polarization Signals – Part 1
	16b	12/04/20	Corrections to B-Mode Notes
01/22/21	17a	01/22/21	B-Mode Polarization Signals – Part 2
02/26/21	17a	01/22/21	B-Mode Polarization (continued)
03/19/21	18a	02/26/21	Marc – Link1 - Gravitaitonal Lensing
	18b	02/26/21	Marc – Link 2 - W. Hu Tutorial Page
	18c	02/26/21	Marc – Link 3 - Cosmology Movie – Part 1
	18c	03/19/21	Marc – Link 3 (continued) – Cosmology Movie – Part 2
	19	03/19/21	History of the Universe Movie (Notes)
04/23/21	20a	04/23/21	Presentation: GW Polarization and LSS E- and B-Modes
	20b	04/23/21	Primordial GWs: +, x, and LSS B-Mode Polarization
	20c	04/23/21	Scalar and Tensor E- and B-Mode Diagrams
	20d	04/23/21	Gravitational Waves (Forbes Mag. Summary)
05/21/21	21a	05/21/21	Cosmological Horizons
06/25/21	22a	06/25/21	Supermassive Black Holes and Galactic Evolution
	23a	04/01/21	Tribute to Art Poskanzer – AIP Oral History Interview
	23b	10/22/18	Paper describing Art’s breakthrough research on the QG Plasma

	23c	07/21/92	Anisotropy as a signature of transverse collective flow
07/30/21	24a	07/19/21	Patty – SciAm: “How to Tell if ET Visitors Are Friend or Foe”
	24b	07/21/21	Notes-Gary-SciAm-ET-v072821
	24c	07/19/21	Patty – SciAm: Search for Life – XPlanet Oceans (New Appr)
	24c	--	Patty’s Presentation: “The Two Interstellar Objects We’ve Found So Far”
	24d	07/20/21	Astrobiology Review
08/27/21	25a	08/27/21	SMBHs - Centers of Spiral & Elliptical Galaxies – Formation & Phenomena
	25b	08/27/21	History of Discoveries leading to derivation of the “Schwarzschild Radius”
	25c	08/27/21	Simplified Derivation of the Schwarzschild Radius
	25d	08/27/21	Event Horizon Telescope Image of M87’s Jet in Polarized Light
09/24/21	26a	09/22/21	Topics & Questions re: SMBH Formation & Phenomena (continued)
	26b	09/22/21	M87 Diagrams
11/05/21	27a	11/05/21	Quantum Entanglement (Wikipedia & 3/17/08 UCB N.Mermin lecture)
	27b	07/20/21	Quantum Magazine: “How Bell’s Theorem Proved ‘Spooky Action at a Distance’ Is Real”
	27c	11/04/64	Bell: “On the Einstein Podolsky Rosen Paradox” [Bell’s Theorem]
	27d	02/07/17	Quantum Magazine: “Experiment Reaffirms Quantum Weirdness”
	27e	07/07/17	MP3 Audio: Experiment partially closed a Bell’s Theorem loophole
	27f	03/21/14	Phys.Rev.Letters (2014): “Testing Bell’s Inequality with Cosmic Photons”
	27g	02/10/17	Phys.Rev.Letters (2017): “Cosmic Bell Test: Measurement Settings from Milky Way Stars”
12/03/21	28a	01/21/25	Summary - Bell’s Theorem
	28b	??/??/99	Gary Felder on Bell’s Theorem “Spooky Action at a Distance” ©1999
	28c	11/27/21	A 1-page summary of N. David Mermin on Bell’s Theorem
	28d	??/??/85	N. David Mermin “Is the Moon there when nobody looks?”
	28e	07/??/81	N. David Mermin: Quantum Mysteries for Anyone 1981
	28f	01/01/81	J. Bell: Bertlmann’s Socks and the Nature of Reality 1981
	28g	??/??/88	J. Bell: 1988 CERN Interview
	28h	08/04/69	Proposed Experiment to test hidden variable theories – CHSH 1969
	28i	09/27/82	Exp. Test of Bell’s Inequalities Using Time-Varying Analyzers–Aspect 1982
	28j	09/16/13	A Simple Proof of Bell’s Inequality – Meccone AJP81 854-2013
	28k	09/07/16	Stony Brook University – Writeup of Violation of Bell’s Inequality 2016
	28l	05/04/20	Brian Greene Video - Full explanation of Bell’s Theorem (Mermin method)
	28k	04/16/20	Brian Greene Video – Quantum Entanglement
01/07/22	29a	12/30/21	James Webb Space Telescope (JWST) Deployment & Systems
	29b	12/30/21	JWST’s L2 Orbit – Description & Calculation of L2’s location/dynamics
	29c	12/30/21	Addendum: L2 calc. (verifying that graphed polynomial is correct)
	29d	01/07/21	JWST Presentation: Systems detail with photos, videos, etc.
	29e	01/08/21	JWST’s Gold Coated Mirrors – IR Reflective
02/04/22	30a	01/30/22	Book: Lawrence M. Krauss: “A Universe From Nothing” (pdf): CHS. 1-2
	30b	01/27/22	Notes on Preface, Chapters 1 – 2 (with info on DE covered in Chapter 5)
	30b1	01/29/22	Narrative Presentation for meeting – Book Appendix, Ch1, Ch2
	30b2	01/29/22	Voice (mp3): Reading of Presentation of Appendix, Ch1 - Ch2
	30c	01/29/22	Lemaître’s updated 1931 paper on GR solution: expansion (orig. 1927)
	30d	05/28/13	Luminet Notes on Lemaître’s work and history of his not receiving credit
	30e	01/30/22	Leavitt’s 1908: “1777 Variables - Mag. Clds” Cepheid period:luminosity rel.
	30f	01/29/22	“Much ado about nothing” – 6/2020 re: motivation for inflationary theory
	30g	01/25/22	Twedt: Type-Ia Supernovae – Accelerating Universe (more for Ch.5)
	30h	01/25/22	Sci.Am. 3/2005: Misconceptions about the Big Bang (more for Ch.5)

	30i	09/22/21	Roger Penrose's Answer to most exciting insight: Universes within Univs.
03/04/22	31a	02/08/22	Notes on Krauss' A Universe from Nothing – Chapters 3 and 4
	31b	02/10/22	Voice (mp3): Reading of Presentation of Notes – Chapters 3 and 4
	31b1	02/10/22	Written narrative of Notes – Chapters 3 and 4
	31b2	03/04/22	Slide Presentation of Krauss' Ch3-4 PDF Version
	31c	04/03/95	L. Krauss and M. Turner: Cosmological Constant Is Back (1995)
	31d	05/07/65	A. Penzias and R. Wilson: Excess Noise paper (1965)
	31e	05/07/65	Dicke Group: CMB Theoretical Basis (1965)
04/01/22	32a	03/05/22	Notes on Krauss' A Universe from Nothing – Chapter 5
	32b	03/05/22	Voice (mp3): Reading of Presentation of Notes – Chapter 5
	32b2	03/05/22	Narrative Summary of Chapter 5
	32c	03/05/22	Perlmutter Group – 1997 Paper
	32d	03/05/22	Schmidt Team – 1998 Paper
	32e	03/05/22	Perlmutter Team – 1999 Paper
	32f	03/05/22	Perlmutter: State of the Parameters
	32g	03/05/22	Perlmutter: 2003 Physics Today Article
	32h	03/05/22	Sean Carroll – Cosmological Constant Article
	32i1	03/05/22	Slide Presentation – Krauss' Chapter 5 – PDF version
	32j	03/28/22	Proof of Spatial Flatness with CMB Data (part of review of chapter 4)
05/06/22	33a	04/09/22	Notes on Krauss' "A Universe from Nothing" – Chapter 6
	33b	03/05/22	Voice (mp3): Reading of Presentation Notes – Chapter 6
	33c	05/06/22	Slide Presentation – Chapter 6 (PDF version of Keynote format)
	33d	04/13/22	Spatial Flatness – Evidence and Meaning
06/10/22	34a	05/29/22	Notes on Krauss' "A Universe from Nothing" – Chapter 7
	34b	06/02/22	Slide Presentation – Chapter 7 (PDF version of Keynote format)
	34c	06/04/22	Voice (mp3): Verbal Presentation of slides – Chapter 7
	34d	04/12/22	CMB Evidence of Spatial Flatness
07/15/22	35a	06/30/22	Notes on Krauss' "A Universe from Nothing" – Chapters 8, 9, 10
	35b	07/15/22	Slide Presentation – Chs 8, 9, 10 (PDF version of Keynote format) / JWST
	35b1	12/ 1980	Wilczek – Cosmic Asymmetry Between Matter and Antimatter
	35c	07/12/22	JWST Commissioning Report (7/12/22)
08/19/22	36a	07/17/22	Chapter 11, Epilog, and Afterward (full text)
	36b	07/18/22	Notes on Krauss' "A Universe from Nothing" – Chapter 11
09/23/22	37a	09/23/22	Notes on JWST's initial finding of early massive galaxies
	37b	09/15/22	SciAm Article – JWST First Glimpses ... "Could Break Cosmology"
	37c	08/12/22	SciMag Article
	37d	09/22/22	Schrodinger's Galaxy Candidate Z17 v Z5 – Naidu
	37e	9/22/22	Stress Testing LCDM
10/28/22	38a	11-09-22a	Notes - Elusive by Frank Close
	38b	11/11/22	CMB-S4 Notes
12/16/22	39a	11/28/22	Notes - CMB B-mode v E-mode polarization
	39b	11/16/22	More Notes on CMB Polarization
	39c	12/2/22 / 11/17/22	ILLUSTRATIONS – CMB B-MODE / CMB E-MODE
	39d	11/27/22	Inflationary Gravitational Waves and B-Mode CMB Polarization
	39e	06/20/14	Original Bicep2 Paper
	39f	06/23/20	SciAm: Is DM Made of Axions?

	39g	10/2019	Axions – Review Excerpt
1/13/23	40a	1/13/23g	Notes – Baggott’s “Higgs” book – Preface and Forward
	40b	12/31/22h	Notes – Higgs Theory
2/17/23	41a	02/18/23zi	Notes - Baggott’s “Higgs” book – Chapter 1
	41b	02/05/23	MP3 Audio – Higgs Ch1-2
3/24/23	42a	03/25/23a	Notes – Baggott’s “Higgs” book – Chapter 2
	42b	03/23/23a	Notes - Yang-Mills Theory
	42c	02/17/23	Ants – a gauge symmetry description
	42d	02/11/23f	Notes – Historical Summary of EW Unification v02-11-2023f
	42e	03/23/23	Addenda – EW Epoch and Higgs mechanism
	42f	2011	Electroweak Theory – a Handout
4/28/23	43a	04/27/23h	Notes – Baggott’s “Higgs” book – Chapter 3
	43b	04/27/23m	Notes – Particles
	43c	04/27/23u	Notes – Particles – Mathematics
5/19/23	44a	05/19/23t	Notes – Baggott’s “Higgs” book – Chapter 4
	44b	05/19/23t	Notes – Baggott’s “Higgs” book – Chapters 3 and 4
	44c	05/14/23d	Summary – Higgs Mechanism
6/30/23	45a	06/10/23u	Notes – Baggott’s “Higgs” book – Chapter 5
	45b1	06/29/23f	Slideshow (Keynote pdf) – Baggott’s “Higgs” – Chapter 5
	45c	06/30/23f	Notes – Presentation for Keynote Slides
8/25/23	46a	07/22/23t	Notes – “Hubble Tension” and the Euclid Spacecraft Mission
	46b	08/11/23	Addenda to Notes
	46c1	08/11/23	Slides (Keynote) for “Hubble Tension” and Euclid Spacecraft
	46d	08/13/23	The Euclid Mission
	46e	07/02/23a	Notes – L2 Orbits (Euclid Mission)
	46f	07/03/23	The Hubble Constant Conflict
	46g	06/09/23	Hubble via Refsdal (SciMag)
	46h	08/25/23	Euclid Spacecraft
	46i	07/26/23	Euclid Update
	46j	07/03/23	Euclid Spacecraft (SciAm)
	46k	06/22/23	Euclid Spacecraft (SciMag)
	46l	07/07/23	Hubble Constant Discrepancy
	46m	07/12/23	Hubble via the CMB
	46n	07/11/23	Methods used to obtain H_0
	46o	07/13/23	GWs and the CMB to derive H_0
	46p	07/03/23	GWs and “Hubble Tension”
10/13/23	47a	1992	“End of Cold Dark Matter?” (M.Davis, G.Efstathiou, C.S.Frenk & S.D.M.White)
	47b	10/13/23	Highlighted “End of Cold Dark Matter”
	47c	10/11/23c	Notes – “End of Cold Dark Matter”
	47d	10/13/23	Notes with page references to paper
1/5/24	48a	12/31/23j	Lee Smolin’s book “The Trouble with Physics” – Last Meeting
	48b	02/01/08	The Case for Background Independence – Smolin in arXiv
	48c	01-03-24a	Mp3 – An Addendum: From Inflation to Sentience
	48d	01-03-24a	Addendum: From Inflation to Sentience