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BIOGRAPHICAL INFORMATION	<i>Date of Birth:</i> 26 January 1980	<i>Citizenship:</i> British
RESEARCH INTERESTS	Theoretical cosmology, reionization, cosmological 21 cm line, large scale structure, cosmic microwave background, inflation, dark energy, neutrino mass	
RESEARCH EXPERIENCE	<p>Imperial College, London, UK</p> <p><i>Lecturer in Astrostatistics</i> October, 2011 - Present</p> <p>Research in cosmology, the epoch of reionization, and astrostatistics.</p> <p>Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts, USA</p> <p><i>Hubble-ITC Fellow</i> September, 2007 - August 2011</p> <p>Post-doctoral research in cosmology, the epoch of reionization, and the theory of the 21 cm line.</p> <p>California Institute of Technology, Pasadena, California, USA</p> <p><i>Graduate Student</i> September, 2002 - June 2007</p> <p>Ph.D. research in cosmology, CMB B-modes, and the early Universe.</p> <p>Cambridge University, Cambridge, UK</p> <p><i>Part III Research project</i> December, 2001 - August, 2002</p> <p>Master's level research into bound fermionic states around black holes, using a gauge theory of gravity. Advisor: Anthony Lasenby.</p> <p>California Institute of Technology, Pasadena, California, USA</p> <p><i>Summer Undergraduate Research Fellowship</i> July, 2001 - September, 2001</p> <p>Undergraduate level research into quintessence models for dark energy. Advisor: Marc Kamionkowski.</p>	
EDUCATION	<p>Imperial College, London, UK</p> <p>Postgraduate Diploma in University Learning & Teaching, Sept, 2014.</p> <p>Postgraduate Certificate in University Learning & Teaching, Sept, 2013.</p> <p>California Institute of Technology, Pasadena, California, USA</p> <p>Ph.D., Physics, June 2007.</p> <ul style="list-style-type: none"> • Advisor: Marc Kamionkowski • Thesis: Extracting the cosmic history from diffuse backgrounds <p>Cambridge University, Pembroke College, Cambridge, Cambridgeshire, UK</p> <p>M.A. (Cantab), Natural Sciences, March, 2004.</p> <p>M.Sci., Natural Sciences, June, 2002.</p> <p>B.A., Natural Sciences, June, 2002.</p>	

HONORS AND AWARDS	<p>Rees Rawlings Prize for best PGCert portfolio, 2013 - Imperial College London</p> <p>Marie Curie Career Integration Grant, 2012 - Imperial College London</p> <p>Hubble Fellowship, 2007 - Harvard College Observatory.</p> <p>Cambridge University, graduated with double First in Physics, 2002.</p> <p>Foundress Prize, Pembroke College, Cambridge University, 2001.</p> <p>Foundation scholar, Pembroke College, Cambridge University, 2000.</p> <p>College scholar, Pembroke College, Cambridge University, 1999.</p>
MENTORING	<p>Claude Schmit, PhD candidate, Imperial, 2014-present</p> <p>Catherine Watkinson, PhD candidate, Imperial, 2011-present</p> <p>Elizabeth Campbell, UROP supervisor, Imperial, Summer 2014</p> <p>Michelle Whitehead, MSc project supervisor, Imperial, Summer 2013</p> <p>Claude Schmit, MSc project co-supervisor, Edinburgh, Summer 2013</p> <p>Jasmina Music, MSc self-study project, Imperial, 2011-12</p> <p>Jared Phau, MSc self-study project, Imperial, 2011-12</p>
TEACHING EXPERIENCE	<p>Imperial College London, UK.</p> <p><i>Lecturer:</i> Cosmology MSci course Spring term 2013 & 14</p> <p><i>Academic tutor:</i> First year undergraduate physics. 2011-12 & 2013-14</p> <p><i>Demonstrator:</i> Second year Python programming 2013-14</p> <p>Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts, USA</p> <p><i>Guest lecturer</i></p> <p>Ay 202a. Galaxies and dynamics. “Gravitational lensing” Fall term 2009</p> <p>California Institute of Technology, Pasadena, California, USA</p> <p><i>Teaching Assistant</i> October, 2002 - March, 2005</p> <p>Duties included small group teaching, leading problem sessions, office hours, and grading.</p> <p>Ph 125. Quantum Mechanics. Fall and Spring term 2005</p> <p>Ph 236. General Relativity. Winter term 2004</p> <p>Ph 125. Quantum Mechanics. Fall term 2004</p> <p>Ph 5, 6, and 7. Sophmore Physics Lab. Fall, Winter and Spring terms 2003-4</p> <p>Ph 6, and 7. Sophmore Physics Lab. Winter and Spring terms 2002-3</p> <p>Ph 3. Freshman Physics Lab. Fall term 2002</p>
OBSERVING EXPERIENCE	<p>Submillimetre Array (SMA) - five nights. Oct 2010.</p>
RESEARCH GRANTS	<p>“FirstDawn”, ERC-Starting Grant (PI/EUR 1,495,000,0-Co-Is,2015-2020)</p> <p>Imperial College Space Physics and Astrophysics STFC Consolidated grant (Co-I/GBP ~4M,16 Co-Is, 2013-2016)</p> <p>“Detecting patchy reionization and the first galaxies using the 21 cm and Lyman alpha lines (21Al-pha)”, FP7 Marie Curie Career Integration Grant (PI/EUR 100k, 0 Co-Is, 2012-2016)</p> <p>“Optimal Statistics for Redshifted 21 cm Observations of the Reionization Epoch ”, NSF-AST (collaborator / US\$ 341,224, 2 PIs, 2011-2014)</p>

“Probing the end of the dark ages and the epoch of reionization with the 21 cm line”, Hubble Fellowship. HST-HF-01211.01-A, NASA/STScI (PI / US\$ 320,487, 0 Co-Is, 2007-2010)

PARTICIPATION IN
PROJECTS

Hydrogen Epoch of Reionization Array (HERA) - PI: A. Parsons - Collaborator (2014-present)

Euclid - Primeval Universe Science Working Group (PU-SWG) (2013-present)

Square Kilometer Array (SKA) - Vice-Chair of SKA-EoR Science Team; member Cosmology Science Team; member Science Working Group (2011-present)

Dark Ages Radio Explorer (DARE) PI: J. Burns - Co-I and Science Working Group (2010-present)

Lunar University Network for Astrophysics Research (LUNAR) - Collaborator (2009-present)

Cosmic Inflation Probe (CIP) PI: G. Melnick - Science Working Group (2008-2010)

STUDENT
EXAMINATION

PhD external examiner - Marta Silva (Advisor: Mario Santos), Lisbon. Oct 2014.

PhD external examiner - Emma Chapman (Advisor: Phillipe Abdalla), UCL. Dec 2013.

PhD opponent - Martina Friedrich (Advisor: G. Mellema), Stockholm University. March 2012.

PROFESSIONAL
ACTIVITIES

UK-SKA science committee. May 2014-present

Co-organiser “Observation and Theory of the first galaxies” NAM2014 parallel session. July 2014. Portsmouth, UK.

Organiser “Reionization and galaxy formation in the first billion years” NAM2013 parallel session. July 2013. St Andrews, Scotland.

SOC “The Epoch of Reionization” Apr 2012. Strasbourg, France.

SOC “LUNAR Workshop: Robotic science from the Moon” Oct 2010, Boulder, CO.

CfA-ITC postdoctoral fellowship selection committee 2009

Co-organiser of CfA-ITC seminar series 2008-9

Member: RAS (2012-present), AAS (2006-present), IOP (2012-present), APS (2010-2011)

Referee: Physics Review D, Physics Review Letters, Astrophysics Journal, Monthly Notices of the Royal Astronomical Society, Physics Letters B, Astronomy and Astrophysics, Journal of Cosmology and Astroparticle Physics, The Harvard Undergraduate Research Journal, Classical and Quantum Gravity.

Reviewer: France-ANR, Canada-NSERC, SA-NRF, NSF-AAG, GMRT-TAC, RAS Penston prize, Royal Society URF, STFC-Rutherford, RAS fellowship, STFC-Consolidated grants.

PUBLIC
ENGAGEMENT

“Cosmic swiss cheese and FM radios”. Science Showoff. London. Nov 2014.

“Don’t feed the scientists!” Live science installation. Loncon3. Aug 2014.

“Cosmic Dawn”. Research Frontiers talk for 1st year ICL physics students. Feb 2014.

Interviewed for Jodcast. Manchester. Nov 2013.

Talk for Big Ideas discussion series. “What are the limits to our knowledge of the Cosmos”. London. 29 Oct 2013.

Interviewed for Dara O Briain’s Science Club. “Adventures in Time”. BBC Two. Air date: 1 August 2013.

Talk to Imperial College Astronomical Society. “Illuminating the cosmic dark ages with the Square Kilometer Array”. Jun, 2013.

Big Bang Fair - Career Networker, 2013.

Science week: Cambridge Explore’s the Universe: Ask an Astronomer 2009, 2010.

Science consultant: “Instant Egghead Guide: the Universe” (2009) by JR Minkel.

SUMMER/WINTER
SCHOOL TEACHING

“ICIC data analysis school”. Imperial College London. Sep 2014.

“The Universe through the 21 cm line”. 5 lecture series for the 6th TRR33 Winter school on Cosmology. Passo del Tonale, Italy. Dec 2012.

INVITED
CONFERENCE
PRESENTATIONS

“Early-universe physics from 21cm surveys”. The Primordial Universe After Planck. IAP, Paris, France. Dec 2014.

“Epoch of reionization/cosmic dawn science with SKA” UK-SKA Science meeting. Birmingham. Jul 2014.

“Seeking $z > 7$ galaxies with 21cm observations”. Galaxy Evolution over Five Decades. Cambridge, UK. Sept 2013.

“New science from the high- z 21cm signal”. Cosmological signals and foregrounds in the radio domain. PCCP, Paris. May 2013.

SKA-EoR Science Team Workshop. SKA Project office, Jodrell Bank, UK. Mar 2013.

“Mapping the Epoch of Reionization”. Oxford Intensity Mapping Workshop. Oxford, Nov 2012.

“21 cm Cosmology”. AIU2010 - Axion Cosmophysics. KEK, Japan, Nov 2012.

“Recent developments in EoR science and the DRM”. PrepSKA WP2. Manchester, Oct 2011.

“Prospects for future 21 cm arrays”. PPC2011. CERN, Geneva, Jun 2011.

“Constraining the epoch of reionization and the dawn of structure with atomic and molecular lines”. Hydrogen Cosmology. ITAMP, Cambridge, MA, May 2011.

“Constraining the dawn of structure with the 21 cm line. AAS 217 HERA special session. Seattle, Jan 2011.

“HI Science through cosmic time”. AAVP2010: Realising the Aperture Array Programme for SKA. Cavendish, Cambridge, UK, Dec 2010.

“Lessons from constraining the global 21 cm spectrum in the presence of foregrounds”. The First Billion Years. Keck Institute of Space Studies, Pasadena CA, Aug 2010.

“Pre-reionization 21 cm signatures”. Astrophysics and Cosmology with the 21 cm background, Aspen, June 2010.

“Atomic physics and the 21 cm line”. DAMOP2010, Houston TX, May 2010.

“Paths to astrophysics with SKA”. SKA2010, Manchester, UK, March 2010. Invited plenary talk.

“21 cm signal throughout cosmic history”. Sackler conference on 21 cm cosmology, Cambridge MA, May 2008.

“Atomic physics and the cosmological 21 cm signal”. Atomic and Molecular Physics of the Early Universe, ITAMP, Cambridge MA, March 2008.

CONTRIBUTED
CONFERENCE
PRESENTATIONS

“Galaxy formation, Cosmology, and the epoch of reionization with the SKA”. UK-SKA Science meeting. RAS, London. Nov 2014.

“Statistics of Reionization and Cosmic Dawn” Unsolved Problems in Astrophysics and Cosmology. Budapest. Jul 2014.

“Cosmology from the EoR/CD”. Advancing Astrophysics with the SKA. Giardini Naxos, Sicily. Jun 2014.

“Cosmology from the EoR”. SKA Cosmology Science Assessment meeting. SKA-HQ, Jodrell Bank. Jan 2014.

“CMB physics”. London Cosmology Meeting. RAS, London. Apr 2013.

“Reionization physics”. London Cosmology Meeting. RAS, London. Jan 2013.

“CO intensity mapping of the epoch of reionization. EAWSS 2012, Rome. Jul 2012.

“Observational and theoretical constraints on reionization”. Reionization and Dark Ages with SKA workshop, Stockholm. Jan 2012.

“Extracting the astrophysics of the first sources from the 21 cm global signal”. New Horizons for High Redshifts, Cambridge, UK. Jul 2011.

“The global 21 cm signal”. Robotic science from the moon, Boulder, CO. Oct 2010.

“Extracting science from the global 21 cm signal”. Astrophysics and Cosmology with the 21 cm background, Aspen. June 2010.

“Constraining reionization using 21 cm experiments in combination with CMB and Lyman alpha forest data”. The High Redshift Universe. Aspen. Jan 2010.

“Constraining reionization using 21 cm experiments in combination with CMB and Lyman alpha forest data”. Reionization with Multi-frequency datasets. Stockholm, Sweden. August 2009.

“21 cm cosmology”. Fingerprints of Inflation. Aspen. June, 2009.

“Lyman series photons and the 21 cm signal”. Reionization@Ringberg. Ringberg Castle, Germany.

March 2009.

“Cosmology from high redshift 21 cm observations”. Foundations of modern cosmology. GGI, Florence Italy. January, 2009.

“Neutrino mass from cosmological 21 cm observations”. Neutrino Oscillation Workshop 2008, Otranto Italy, September 2008.

“Probing the First Sources with the Redshifted 21 cm Line”. 209th Meeting of the American Astronomical Society. Seattle, January, 2007.

“Radiation fields from the first stars and the redshifted 21 cm line”. Radiation Backgrounds from the First Stars, Galaxies and Black Holes. Maryland, October, 2006.

“Radiation fields from the first stars and the redshifted 21 cm line”. The first stars and evolution of the early Universe. INT Seattle, August, 2006.

“Descending from on high: Lyman series cascades and spin-kinetic temperature coupling in the 21 cm line”. Reionizing the Universe 2005. Groningen, Netherlands, July 2005.

“Tensor modes and the cosmic microwave background” (poster). 2nd Advanced Chilean Winter School. Santiago, Chile, November 2004.

OTHER
CONFERENCE
PARTICIPATION
SEMINAR
PRESENTATIONS

“Twitter and researchers: Friend or foe?” #solo14ECR panel discussion. Science Online London. Nov 2014.

2013: Birmingham, Cavendish, Oxford, Manchester.

2012: Aachen, APC-Paris, Copenhagen-NBI, Durham, Edinburgh, Portsmouth, Sussex, UCL.

2011: Brown, Cambridge - IoA, CCAPP-OSU, Imperial, ITAMP-CfA, Leiden, Perimeter, Princeton, Waterloo.

2010: Berkeley, Cambridge - Kavli, Carnegie Mellon, CITA, Chicago, Oxford, Yale.

2009: CfA. *2008*: UT Austin. *2006*: KIPAC, Berkeley, Columbia ISCAP, Harvard ITC.

COMPUTER SKILLS

- Languages: C, C++, Fortran 77 & 90, HTML, IDL, Perl, Python.
- Cosmology: CMBFAST, CAMB, COSMOMC, HEALPIX.

ACADEMIC
REFERENCES

Marc Kamionkowski,
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SUBMITTED
PUBLICATIONS

- [31] C. A. Watkinson, A. Mesinger, **J. R. Pritchard**, E. Sobacchi, “21-cm signatures of residual HI inside cosmic HII regions during reionization”. MNRAS submitted [arXiv:1501.01970]
- [30] T.-C. Chang et al. “Synergy with CO/[CII]/Ly α Line Intensity Mapping with the SKA”. PoS, submitted (2014) [arXiv:1501.04654].
- [29] A. Mesinger et al. “Constraining the Astrophysics of the Cosmic Dawn and the Epoch of Reionization with HI Data with the SKA”. PoS, submitted (2014) [arXiv:1501.04106].
- [28] Ravi Subrahmanyan et al. “All-sky signals from recombination to reionization with the SKA”. PoS, submitted (2014) [arXiv:1501.04340].
- [27] **J.R. Pritchard** et al. “Cosmology from EoR/Cosmic Dawn with the SKA”. PoS, submitted (2014) [arXiv:1501.04291].

REFEREED
PUBLICATIONS

- [26] S. C. O. Glover, J. Chluba, S. R. Furlanetto, **J. R. Pritchard**, D. W. Savin, “Atomic, Molecular, and Optical Physics in the Early Universe: From Recombination to Reionization”. Advances in Atomic, Molecular, and Optical Physics, 63, 135 (2014).
- [25] Catherine Watkinson and **Jonathan R. Pritchard**, “Distinguishing models of reionization using future radio observations of 21-cm 1-point statistics”. MNRAS, 443, 3090 (2014) [arXiv:1312.1342].
- [24] Adrian Liu, **Jonathan R. Pritchard**, Max Tegmark, and Abraham Loeb. “Global 21 cm signal experiments: a designer’s guide” PRD, 87, 043002 (2013) [arXiv:1211.3743].
- [23] Mellema, G. *et al.*, “Reionization and the Cosmic Dawn with the Square Kilometre Array”. Experimental Astronomy, 36, 235 (2013) [arXiv:1210.0197].
- [22] **Jonathan R. Pritchard** and Abraham Loeb. “21 cm cosmology”. Reports on Progress in Physics, 75, 086901 (2012). [arXiv:1109.6012].
- [21] Geraint J. A. Harker, **Jonathan R. Pritchard**, Jack O. Burns, Judd D. Bowman. “An MCMC approach to extracting the global 21-cm signal during the cosmic dawn from sky-averaged radio observations”. MNRAS, 419, 1070 (2011) [arXiv:1107.3154].
- [20] Jack O. Burns, T. J. W. Lazio, S. D. Bale, J. D. Bowman, R. F. Bradley, C. L. Carilli, S. R. Furlanetto, G. J. A. Harker, A. Loeb, **J. R. Pritchard**. “Probing the First Stars and Black Holes in the Early Universe with the Dark Ages Radio Explorer (DARE)”. Advances in Space Research, 49, 433 (2011) [arXiv:1106.5194].
- [19] Adam Lidz, Steven R. Furlanetto, S. Peng Oh, James Aguirre, Tzu-Ching Chang, Olivier Dore, **Jonathan R. Pritchard**. “Intensity Mapping with Carbon Monoxide Emission Lines and the Redshifted 21 cm Line” ApJ, 741, 70 (2011) [arXiv:1104.4800].
- [18] K. N. Abazajian, E. Calabrese, A. Cooray, F. De Bernardis, S. Dodelson, A. Friedland, G. M. Fuller, S. Hannestad, B. G. Keating, E. V. Linder, C. Lunardini, A. Melchiorri, R. Miquel, E. Pierpaoli, **J. Pritchard**, P. Serra, M. Takada, Y. Y. Y. Wong. “Cosmological and Astrophysical Neutrino Mass Measurements”. Astroparticle Physics, 35, 177 (2011) [arXiv:1103.5083].
- [17] Mirabel, I.F., Dijkstra, M., Laurent, P., Loeb, A. and **Pritchard, J.R.** “Stellar black holes at the dawn of the universe”. A&A, **528**, 149 (2011) [arXiv:1102.1891].
- [16] Santos, M.G., Silva, M.B., **Pritchard, J.R.**, Cen, R. and Cooray, A. “Probing the first galaxies with SKA” A&A, **527**, 93 (2011) [arXiv:1009.0950]

- [15] Adshead, A., Easther, R., **Pritchard, J.**, and Loeb, A., “Inflation and the Scale Dependent Spectral Index: Prospects and Strategies”. JCAP, **2**, 21 (2011)[arXiv:1007.3748]
- [14] **Pritchard, J.R.** and Loeb, A., “Constraining the unexplored period between reionization and the dark ages with observations of the global 21 cm signal”, PRD, **82**, 023006 (2010) [arXiv:1005.4057]
- [13] **Pritchard, J.R.**, Loeb, A., and Wyithe, J.S.B., “Constraining reionization using 21 cm observations with CMB and Lyman-alpha forest data”, MNRAS, **408**, 57 (2010) [arXiv:0908.3891]
- [12] Gordon, C. and **Pritchard J.R.**, “Forecasted 21 cm constraints on compensated isocurvature perturbations”, PRD, **80**, 063535 (2009) [arXiv:0907.5400]
- [11] Colombo, L.P.L., Pierpaoli, E., and **Pritchard, J.R.** “Cosmological parameters after WMAP5: forecasts for Planck and future galaxy surveys”, MNRAS, **398**, 1621 (2009) [arXiv:0811.2622]
- [10] Dijkstra, M., Lidz, A., **Pritchard, J.R.**, Greenhill, L.J., Mitchell, D.A., Ord, S.M., and Wayth, R.B. “On the detectability of the Hydrogen 3-cm Fine structure line from the EoR”, MNRAS, **390**, 1430 (2008) [arXiv:0809.4279]
- [9] **Pritchard, J.R.** and Pierpaoli, E. “Constraining massive neutrinos using cosmological 21 cm observations”, PRD, **78**, 065009 (2008). [arXiv:0805.1920]
- [8] **Pritchard, J.R.** and Loeb, A. “Evolution of the 21 cm signal throughout cosmic history”, PRD, **78**, 103511 (2008). [arXiv:0802.2102]
- [7] Santos, M.G., Amblard, A., **Pritchard, J.**, Trac, H., Cen, R., Cooray, A. “Cosmic reionization and the 21 cm signal: simulations and analytical models”, ApJ, **689**, 1 (2008). [arXiv:0708.2424]
- [6] **Pritchard, J.R.** and Furlanetto, S.R. “21 cm fluctuations from inhomogeneous X-ray heating before reionization”, MNRAS, **376**, 1680 (2007). [astro-ph/0607234]
- [5] Furlanetto, S.R. and **Pritchard, J.R.** “The scattering of Lyman-series photons in the IGM”, MNRAS, **372**, 1093 (2006). [astro-ph/0605680]
- [4] **Pritchard, J.R.**, Furlanetto, S.R. and Kamionkowski, M. “Galaxy surveys, inhomogeneous reionization, and dark energy”, MNRAS, **374**, 159 (2007). [astro-ph/0604358]
- [3] **Pritchard, J.R.** and Furlanetto, S.R. “Descending from on high: Lyman series cascades and spin-kinetic temperature coupling in the 21 cm line”, MNRAS, **367**, 1057 (2006). [astro-ph/0508381]
- [2] **Pritchard, J.R.** and Kamionkowski, M. “Cosmic microwave background fluctuations from gravitational waves: an analytic approach”, Annals of Physics, **318**, 2 (2005). [astro-ph/0412581]
- [1] Lasenby, L., Doran, C., **Pritchard, J.**, Caceres, A. “Bound states and decay times of fermions in a Schwarzschild black hole background”, PRD, **72**, 105014 (2005). [gr-qc/0209090]

UNREFEREED
PUBLICATIONS

- [xi] Pritchard, J.R. *et al.* “Asking gender questions: Results from a survey of gender and question asking among UK Astronomers”, Astronomy & Geophysics, **55(2)**, 8 (2014) [arXiv:1412.4571].
- [x] Brown, M.L. *et al.* “Probing the accelerating Universe with radio weak lensing in the JVLA Sky Survey”, VLASS White paper (2013). [arXiv:1312.5618]
- [ix] SKA Science Working Group. “The Square Kilometer Array Design Reference Mission: SKA Phase 1” (2011).

[viii] Pritchard, J. and Loeb, A. “Hydrogen was not ionized abruptly”, *Nature news and views*, **468**, 772 (2010).

[vii] Pritchard, J.R. and Pierpaoli, E. “Neutrino mass from cosmological 21 cm observations”, *Nucl. Phys. Proc. Suppl.* **188**, 31 (2009).

[vi] Burns *et al.*, “Science from the Moon: The NASA/NLSI Lunar University Network for Astrophysics Research (LUNAR)”, Planetary Decadal white paper (2009). [<http://lunar.colorado.edu/publicfiles/30Aug09.pdf>]

[v] Melnick, G.J. *et al.*, “Inflation and the Power of a High- z galaxy survey”, Astro 2010 white paper no. 204 (2009). [<http://www8.nationalacademies.org/astro2010/DetailFileDisplay.aspx?id=72>]

[iv] Furlanetto, S.R. *et al.*, “Astrophysics from the Highly-Redshifted 21 cm Line”, Astro 2010 white paper no. 83 (2009). [[arXiv:0902.3011](http://arxiv.org/abs/0902.3011)]

[iii] Furlanetto, S.R. *et al.*, “Cosmology from the Highly-Redshifted 21 cm Line”, Astro 2010 white paper no. 82 (2009). [[arXiv:0902.3259](http://arxiv.org/abs/0902.3259)]

[ii] Burns, J. *et al.*, “Science from the Moon: The NASA/NLSI Lunar University Network for Astrophysics Research (LUNAR), Planetary Sciences Decadal Review white paper (2009). [[arXiv:0909.1509](http://arxiv.org/abs/0909.1509)]

[i] Amin, M.A. *et al.*, “A pedagogical primer on preheating”, *Les Houches Summer School Proceedings* (2006).

POPULAR SCIENCE [a] Abraham Loeb and Jonathan Pritchard, “The missing reel”. *New Scientist*, Oct 24, 2012.
ARTICLES [<http://www.newscientist.com/article/mg21628881.900-the-universe-the-full-story.html>]