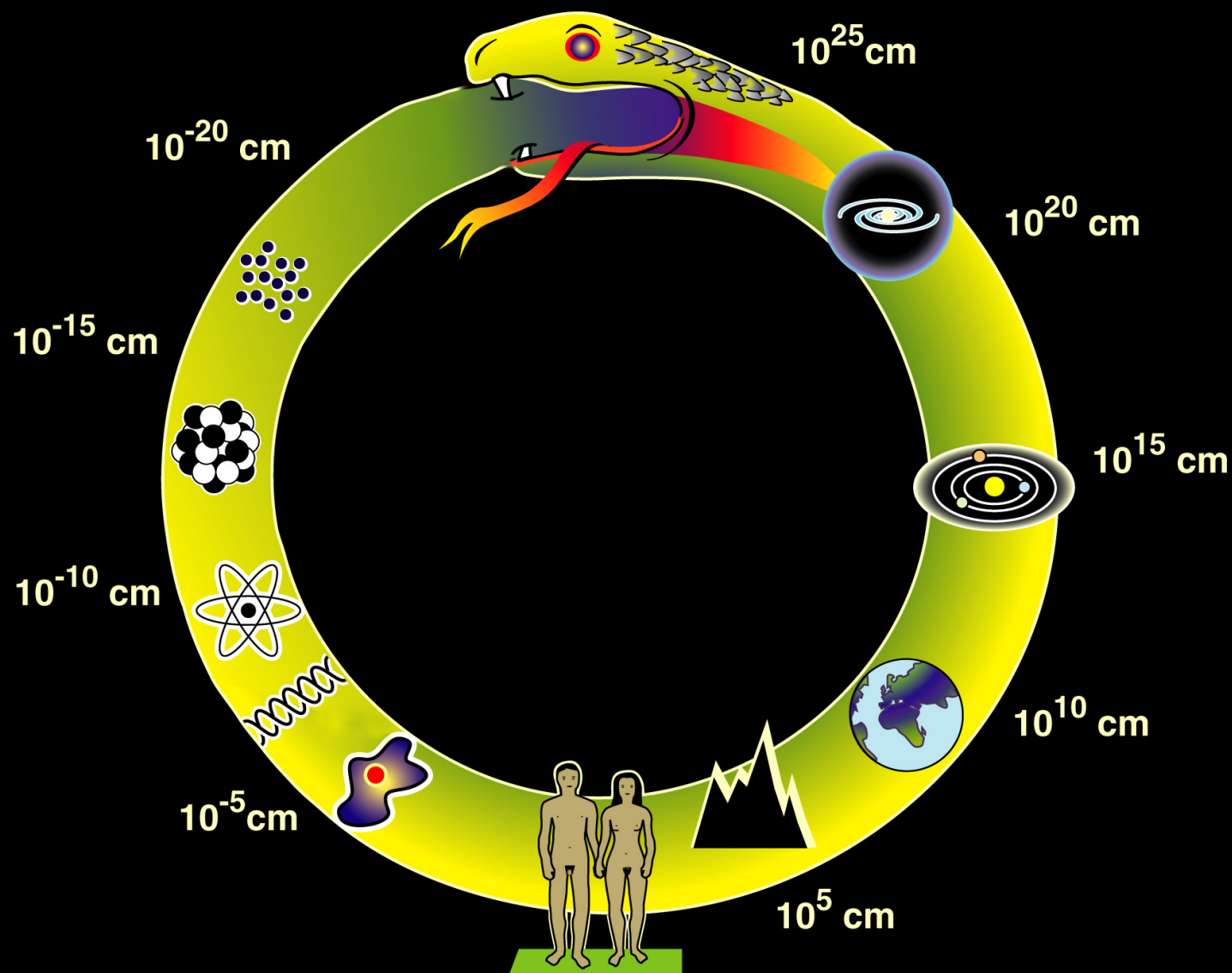




South Africa---China bilateral collaboration and NAOC—UKZN Computational
Astrophysics Centre (NUCAC)

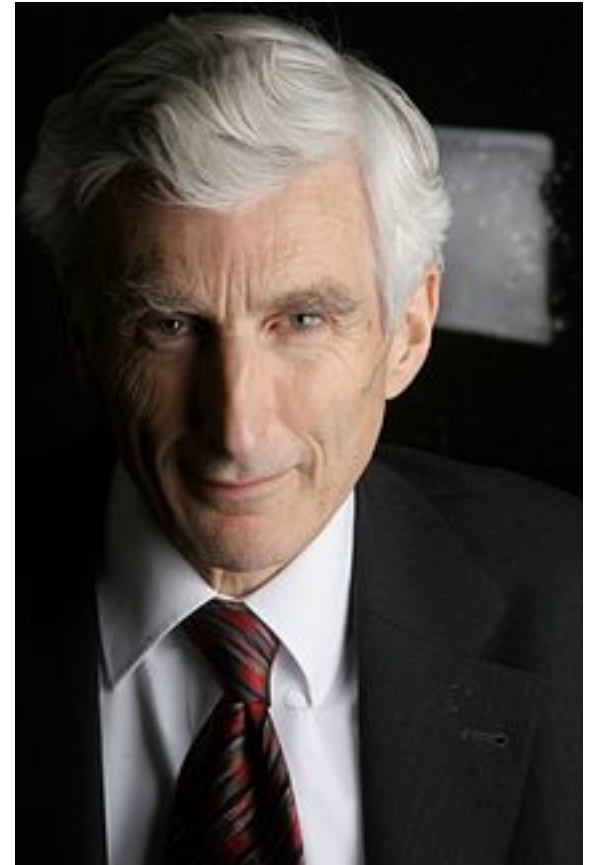
Yin-Zhe Ma
University of KwaZulu-Natal





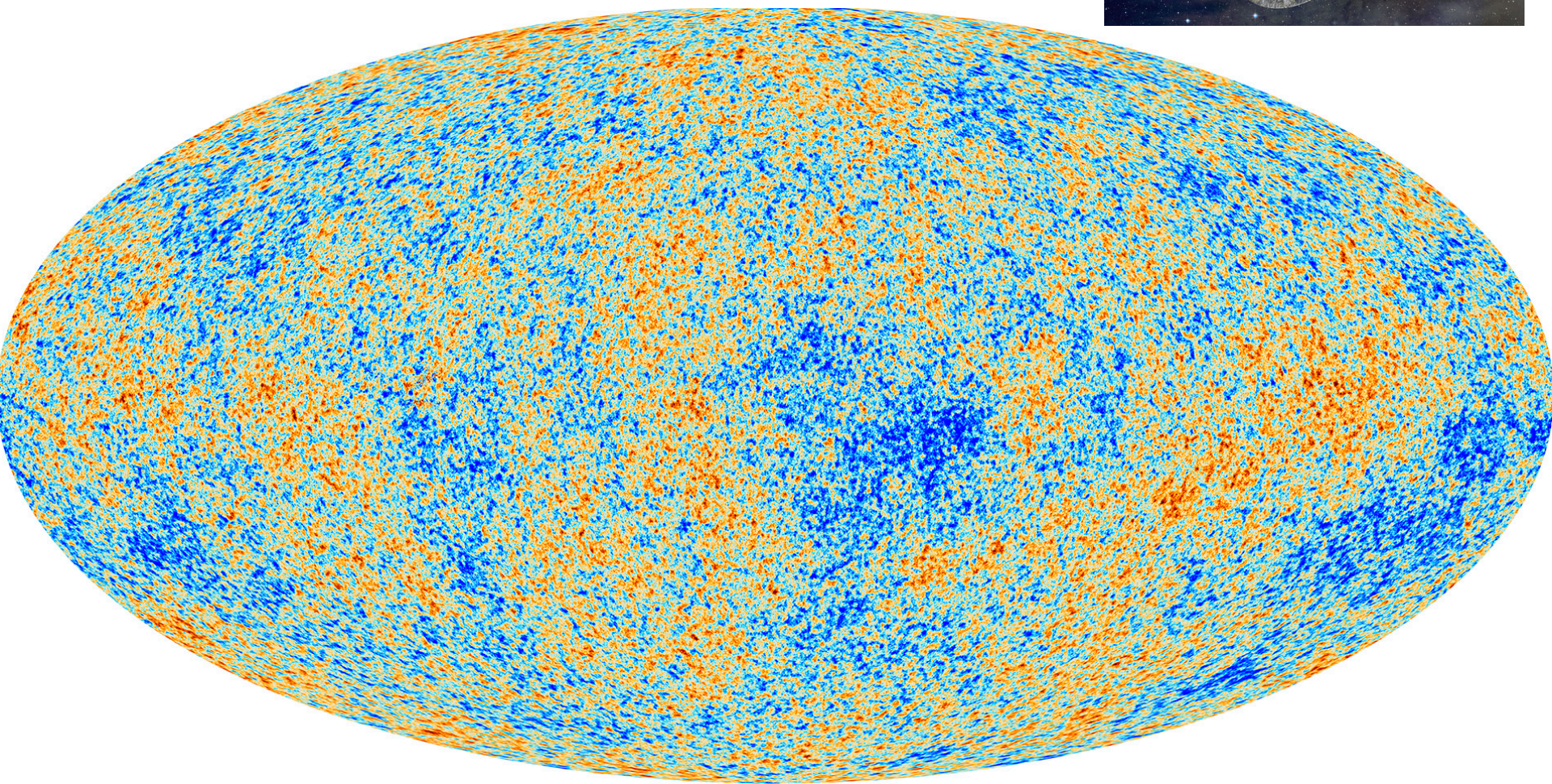
Astrophysics and Cosmology

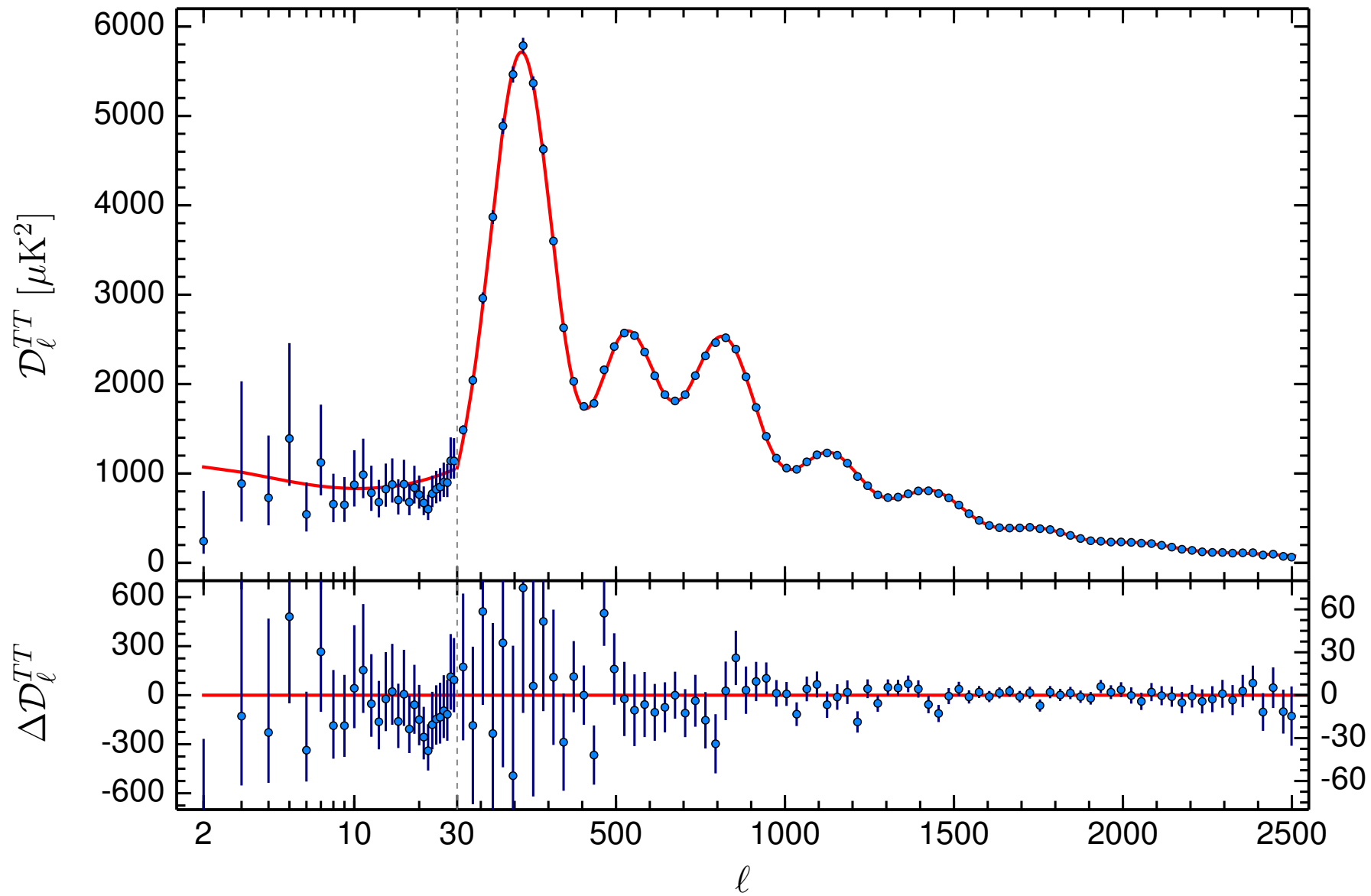
- Mud wrestling
- Chess player era



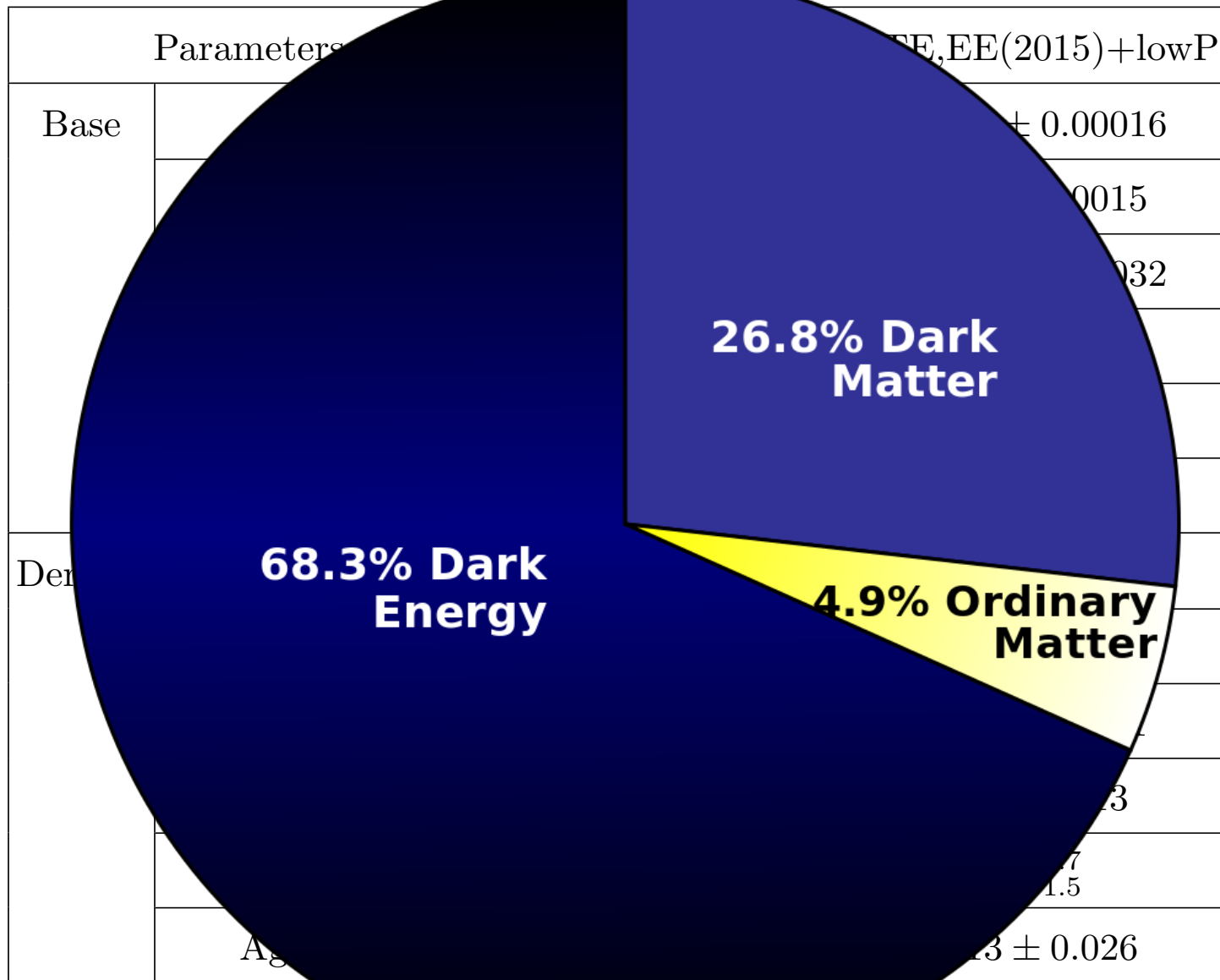
Martin Rees

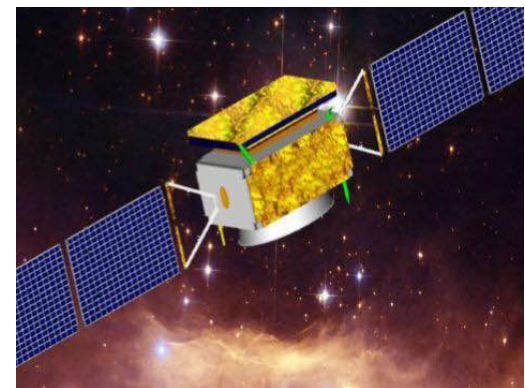
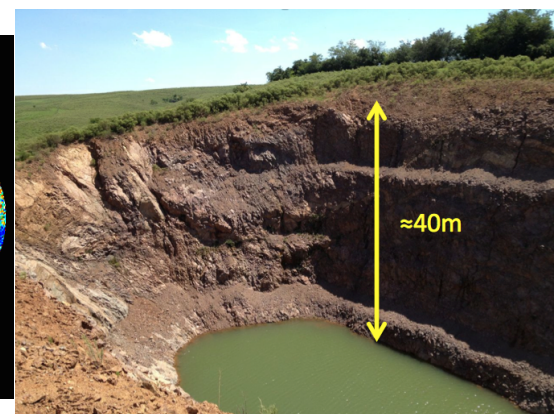
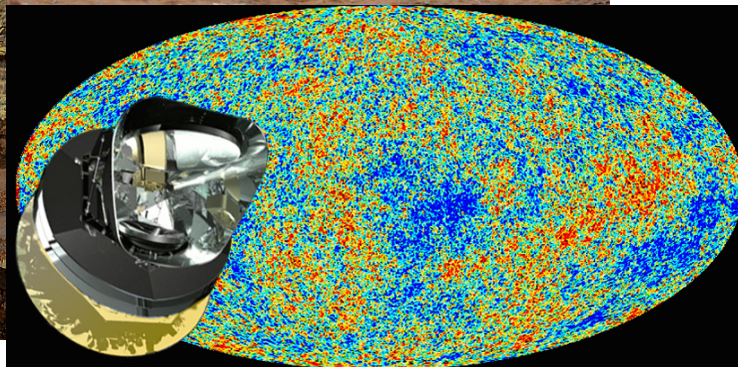
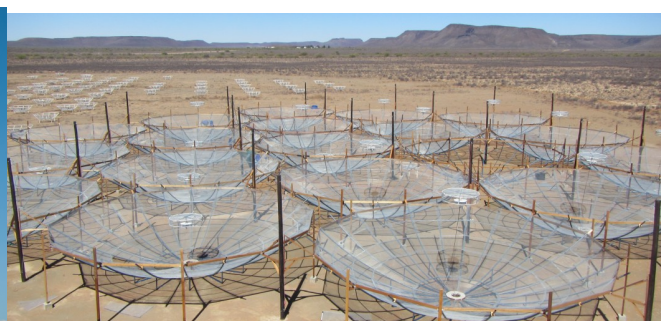






Parameters		TT(2013)+WP	TT,TE,EE(2015)+lowP
Base	$\Omega_{\text{b}}h^2$	0.02205 ± 0.00028	0.02225 ± 0.00016
	$\Omega_{\text{c}}h^2$	0.1199 ± 0.0027	0.1198 ± 0.0015
	$100\theta_*$	1.04131 ± 0.00063	1.04077 ± 0.00032
	τ	$0.089^{+0.012}_{-0.014}$	0.079 ± 0.017
	n_{s}	0.9603 ± 0.0073	0.9645 ± 0.0049
	$\ln(10^{10}A_{\text{s}})$	$3.089^{+0.024}_{-0.027}$	3.094 ± 0.034
Derived	H_0 [km s $^{-1}$ Mpc $^{-1}$]	67.3 ± 1.2	67.27 ± 0.66
	Ω_{Λ}	$0.685^{+0.018}_{-0.016}$	0.6844 ± 0.0091
	Ω_{m}	$0.315^{+0.016}_{-0.018}$	0.3156 ± 0.0091
	σ_8	0.829 ± 0.012	0.831 ± 0.013
	z_{re}	11.1 ± 1.1	$10.0^{+1.7}_{-1.5}$
	Age [Gyr]	13.817 ± 0.048	13.813 ± 0.026





Research interests	South African projects/groups/researchers	Chinese projects/groups/researchers/
21-cm Intensity mapping	HIRAX project (Yin-Zhe Ma (UKZN), Jon Sievers (UKZN), Kavi Moodley (UKZN), Cynthia Chiang (UKZN)) KAT-7 dish (Mario Santos (UWC), Yin-Zhe Ma (UKZN))	TianLai project (Xuelei Chen) FAST project (Di Li, Xuelei Chen)
Fast Radio burst observation	HIRAX project and UKZN: Jon Sievers, Yin-Zhe Ma Green Bank Telescope involved: Jon Sievers	FAST project: Di Li Green Bank Telescope involved: Xuelei Chen SHAO/CAS: Wen-fei Yu
Epoch of Reionization	HERA project: Cynthia Chiang, Jon Sievers SCI-HI project: Jon Sievers	21CMA project: Xiang-Ping Wu, Yidong Xu, Tsinghua U: Yi Mao,
Cosmic Microwave Background radiation	CORE project: Sergio Colafrancesco Planck project: Yin-Zhe Ma, Cynthia Chiang SPIDER project: Cynthia Chiang Theoretical studies: R. Maartens, K. Moodley, C. Clarkson, A. Weltman, M. Santos	NAOC: Xuelei Chen Beijing Normal U: Zong-Hong Zhu Peking University: Zuhui Fan SJTU: Yi-Peng Jing ITP/CAS: Rong-Gen Cai
Dark Matter theories and observations	UCT: Amanda Weltman	DAMPE project: Jin Chang (PMO), Xiao-Jun BI (IHEP)
Large-scale structure study	UWC: Roy Maartens UCT: Chris Clarkson Wits: Andreas Faltenbacher	SDSS-IV involved: Gongbo Zhao(NAOC), Cheng Li (Tsinghua), Charling Tao (Tsinghua) Beijing Normal U: Zong-hong Zhu NAOC: Hu Zhan, Yan Gong, Jun Pan
Computational Astrophysics	UWC: Russ Taylor, Catherine Cress Wits: Andreas Faltenbacher UKZN: Yin-Zhe Ma, Jon Sievers	NAOC: Liang Gao, Rain Spurzem, Qi Guo, Jie Wang SJTU: Yi-ping Jing, Pengjie Zhang
Theoretical cosmology: including inflation, early Universe, modified gravity	UWC: Roy Maartens UCT: Amanda Weltman, Chris Clarkson UKZN: Kavi Moodley Wits: Sergio Colafrancesco	NAOC: Xuelei Chen, Gong-Bo Zhao, Shuang-nan Zhang ITP: Rong-Gen Cai Sun-Yat Sen University: Miao Li
SKA key science working group	UWC: Mario Santos, Roy Maartens, Russ Taylor UKZN: Yin-Zhe Ma, Jon Sievers, Kavilan Moodley, Cynthia Chiang	NAOC: Xuelei Chen, Gong-Bo Zhao, Di Li SHAO: Wen-fei Yu
Big Data and Virtual Observatory	Russ Taylor (UWC), Yin-Zhe Ma (UKZN), Lindsay Magnus (SKA), Bruce Bassett (AIMS), Brandley Frank (UCT), Rob Simmonds (UCT)	NAOC: Chenzhou Cui, Dongwei Fan, Rainer Spurzem, Shanshan Li SHAO: Tao An XAO: Hailong Zhang KIAA: Richard de Grijs PMO: Xianzhong Zheng
Gravitational waves from astrophysical sources and detection	Denis Pollney (Rhodes), Nigel Bishop (Rhodes)	Sun-Yat Sen University: Miao Li



Title of the workshop	South African PI	Chinese PI
Cosmology with large surveys	Yin-Zhe Ma (UKZN)	Xuelel Chen (NAOC)
Sharing resources and building collaborations in optical and infrared astronomy	Petri Vaisanen (SAAO)	Subo Dong (PKU)
Very long baseline interferometry (VLBI)		Zhiqiang Shen (SHAO)
Big Data challenge in Astronomy	Russ Taylor (UWC)	ChenZhou Cui (NAOC)
Synergy between MeerKAT and FAST	Claude Carignan (UCT)	Bo Peng (NAOC)

NAOC—UKZN Computational Astrophysics Centre (NUCAC)



UKZN

Faculty Member	PhD Institution	Research Areas	Projects
H. Cynthia Chiang	Caltech	Observational cosmology, instrumentation and data analysis for CMB and reionization	SPIDER, Planck, South Pole Telescope, C-BASS, SCI-HI, HERA, HIRAX
Matt Hilton	Liverpool John Moores	Galaxy evolution and formation, galaxy clusters	Atacama Cosmology Telescope, XMM, HIRAX , MeerKAT
Yin-Zhe Ma	Cambridge	21-cm intensity mapping, radio weak lensing, CMB, peculiar velocity field	SKA, MeerKAT, Planck, 6dF Galaxy Survey
Sunil Maharaj	Witwatersrand	Relativistic kinetic theory, conformal theory, cosmology	
Kavilan Moodley	Cambridge	CMB, large-scale structure, perturbation theory	Atacama Cosmology Telescope, HERA, HIRAX, MeerKAT
Subharthi Ray	Jadavpur	High-energy astrophysics, general relativity, cosmology	
Rituparno Goswami	TIFR	General relativity, cosmology	
Jonathan Sievers	Caltech	CMB and 21-cm cosmology, observational cosmology	Atacama Cosmology Telescope, C-BASS, SCI-HI, HIRAX, HERA, MeerKAT

National Astronomy and Space Science program

Cosmology

Fluid dynamics

Mathematical Method

Computational Astrophysics

Astronomy and Astrophysics

Classical field theory

Plasma Physics

Space Physics

Research Project

Techniques in astrophysics and space science

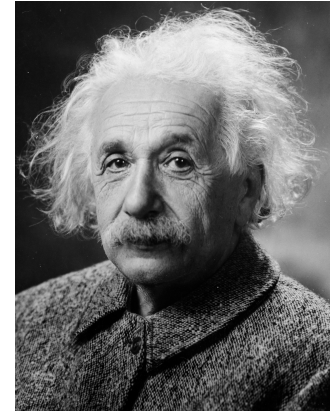
- Student Exchange Program
- Joint Postdoctoral fellowship program

2017—2019 Program	UKZN	NAOC/PMO
Radio Astronomy, 21-cm cosmology	Cynthia Chiang, Yin-Zhe Ma, Jonathan Sievers	Xuelel Chen, Yi Mao, Di Li
Computational Astrophysics	Yin-Zhe Ma, Jonathan Sievers, Romeel Dave, Sergio Colafrancesco	Liang Gao, Xuelel Chen
Cosmology	Yin-Zhe Ma, Kavilan Moodley, Roy Maartens	Gong-Bo Zhao et al.
Fast Radio Bursts	Yin-Zhe Ma, Jonathan Sievers	Xuefeng Wu (Zi-Gao Dai)

- Collaboration on Project
- Scientists visiting program
- Annual Distinguished Lectures
- Public Engagement and involvement

-----The first five year round 2017--2021

- Politics is for the moment and equation is for eternity.



- If your plan is for one year plant rice. If your plan is for ten years plant trees. If your plan is for one hundred years educate people.



