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SKA-HCD CONFERENCE, CAPE TOWN
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Astrophysics and Cosmology Research Unit



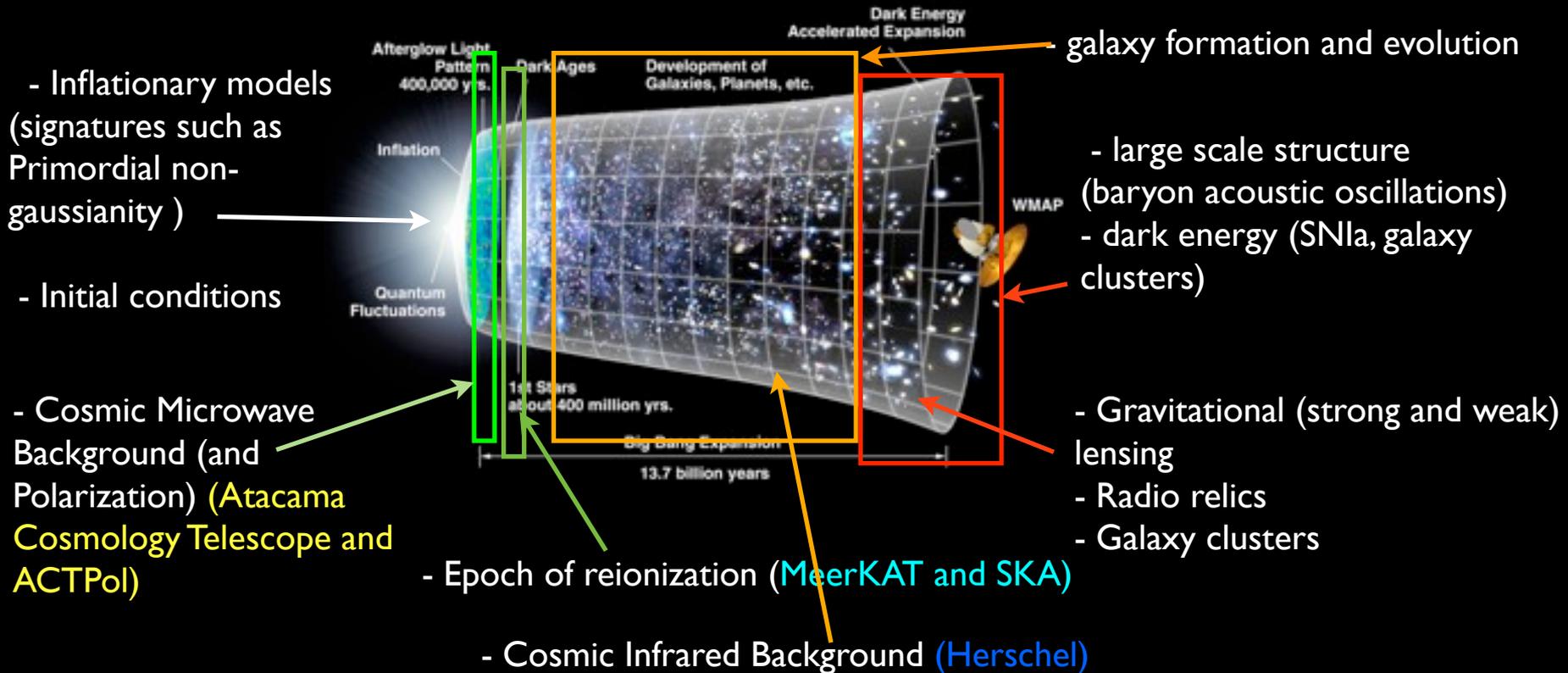
Staff: 8 permanent staff members (7 in Maths, 1 in Physics), research professorship in the process of accepting

Postdocs: 4 current postdocs, 2 new (this October, next October)

Students: ~15 postgraduate students

WE ARE GROWING!!!!!!

Astrophysics and Cosmology Research Unit



- Inflationary models (signatures such as Primordial non-gaussianity)

- Initial conditions

- Cosmic Microwave Background (and Polarization) (Atacama Cosmology Telescope and ACTPol)

- Epoch of reionization (MeerKAT and SKA)

- Cosmic Infrared Background (Herschel)

galaxy formation and evolution

- large scale structure (baryon acoustic oscillations)
- dark energy (SNIa, galaxy clusters)

- Gravitational (strong and weak) lensing
- Radio relics
- Galaxy clusters

UKZN Partnerships with South Africa SKA



Faculty Positions:

- Created 2 new lecturer positions funded by SA SKA for 5 years
 - made into permanent positions by UKZN
- Huge impact in terms of reaching critical mass for postdoctoral mentoring, undergraduate and postgraduate supervision
 - offer two new courses in Astronomy (2nd year course in physics, 3rd year course in Maths, 1 honours course in astrophysics)
 - re-start our seminar series
 - weekly journal club

UKZN Partnerships with South Africa SKA



Postgraduate Research Students

- About 6 students (graduates and current) funded in the last 5 years
- Expanding this number with UKZN applications for SKA project postgraduate scholarships in 2012

UKZN Partnerships with South Africa SKA



Undergraduate programme:

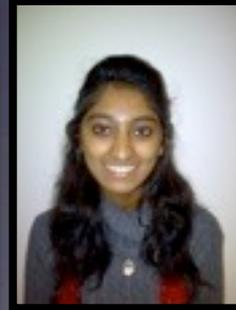
- Block grant given to UKZN in 2010, 2011 and 2012
- Supports 4 new bursary students each year
- Currently 10 SKA bursars at UKZN
- Includes 3 Botswana undergraduates doing science and engineering degrees



ONE STUDENT IN 2009



THIRTEEN STUDENTS IN 2012
OUT OF WHICH 10 ARE BURSARY
HOLDERS AND AN ADDITIONAL
3 HAVE JOINED OUR UIP
PROGRAMME



UKZN Partnerships with South Africa SKA



Undergraduate programme:

Undergraduate Internship program (UIP)

- In order to help our undergraduate bursars to excel, ACRU (staff and students) run a mentorship and specialized tutoring programme
 - Tutoring (Over and above university tutoring)
 - Examination and test revision
 - Mentoring
 - Vacation projects
 - involvement in outreach program



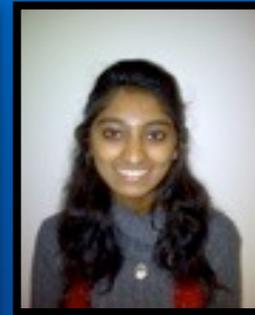
UKZN Partnerships with South Africa SKA



Undergraduate programme:

Undergraduate Internship program (UIP)

- other students with an interest in pursuing a career in Astrophysics or related fields have been given the opportunity to join our UIP
- 3 additional students without bursaries have been recruited into this programme



Links with African Partner countries



- Have not developed these as yet but are keen to do so
- Plan to grow our links through this workshop and available instruments
- Also thinking about other mechanisms

Links with African Partner countries



Current Situation: Postgraduate Students

Stumbling blocks:

- Number of applications received from partner African countries
- hard to assess quality of applicants
- many students do not have complete range of skills required e.g. stats, physics, maths, computing

Links with African Partner countries



Current Situation: Postgraduate Students

Possible solutions:

1. Host a postgrad student workshop

- establish links with academics and advanced undergrad/postgrad students in African partner countries
- contextualize learning
- build astrophysics background and relevant skills

2. Visit targeted universities in African partner countries

- interact with faculty and students (give talks/lectures)
- establishing more direct partnerships

Links with African Partner countries



Current Situation: Postgraduate Students

Possible solutions:

3. Explore opportunities through NASSP and AIMS
 - We have some UKZN postgraduates from African partner countries that finished at AIMS and NASSP
 - we can utilize this network to grow links

Links with African Partner countries



Current Situation: Undergraduate Students

- Currently host Botswana undergraduate students in science and engineering
 - part of undergraduate internship programme (UIP)
- take more undergraduate students from African partner countries into our program

Other Ideas



- Lecturer and postdoc exchange
 - possible sabbaticals of African partners to work on Astrophysics projects
- Exchange of resources
 - make lecturing materials available (eg. M Bucher and K Moodley taught a radio astronomy course at AIMS)
 - postgrads who have experience with radio astronomy data analysis software could work with staff and students from partner countries

Other Ideas



- Co-supervision of students
 - will only work well if student spends enough time with both supervisors
 - can organize extended stay of supervisors (and students) at SA universities and partner African universities

Outreach Program at ACRU



A few examples:

- astronomy workshops during university vacations (targeted learners who excelled in Mathematics and Physics, also involve our SKA bursars)
 - various public lectures (talks at schools, conferences in other fields, taken advantage of astronomical events)
 - many student visits for work experience
 - a series of public lectures on interesting topics starting in October, followed by telescope viewing session
 - ACRU career week (recruit students into our undergraduate programme)



ASTRONOMY OUTREACH AT UKZN



- Outreach Program:
 - astronomy workshops during university vacations (targeted learners who excelled in Mathematics and Physics)
 - various public lectures (talks at schools, conferences in other fields, taken advantage of astronomical events)
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ACRU CAREER WEEK



- We aimed to recruit students into our undergraduate programme for which we paired up with the SKA.
- To recruit these learners we held workshops that targeted learners who excelled in Mathematics and Physics.
- Our first learner was awarded a bursary in 2009 and she has since graduated with her undergraduate degree and is currently pursuing her honours.
- The programme started with one learner in 2009 and in 2012 we now have a total of eleven students in our bursary programme.



“Astronomy has a potential to encourage a greater interest in scientific careers among the youth.” Minister Naledi Pandor

- The interest in astronomy is growing greatly in South Africa.
- Our aim at ACRU, UKZN is to take astronomy to as many people as we can.
- By working together we will be able to achieve this at a more rapid pace.
- The strength in any country are the children.
- All children, especially disadvantaged children need to understand the opportunities that are available to them in South Africa and the world at large when they choose astronomy and related fields as a career choice.