



EUROPEAN COMMISSION  
RESEARCH DG HUMAN RESOURCES  
AND MOBILITY

RTN Periodic Activity Report

**Project No.:** 35863

**Project Acronym:** UniverseNet

**Project Full Name:** The origin of our universe: seeking links between  
fundamental physics and cosmology

## Marie Curie Actions

# RTN Periodic Activity Report

**Period covered:** from 01/10/2006 to 30/09/2007

**Date of preparation:** 06/12/2007

**Period number:** 1st

**Start date of project:** 01/10/2006

**Date of submission (SESAM):**  
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**Project coordinator name:**  
Prof. Subir Sarkar

**Duration:** 48

**Project coordinator organisation name:**  
THE CHANCELLOR, MASTERS AND SCHOLARS  
OF THE UNIVERSITY OF OXFORD

**Version:** 1

# Marie Curie Actions

## RTN Periodic Activity Report

### GENERAL INFORMATION

<b>Project No.:</b>	35863
<b>Project acronym:</b>	UniverseNet
<b>Project full name:</b>	The origin of our universe: seeking links between fundamental physics and cosmology
<b>Period number:</b>	1st
<b>Period covered - start date:</b>	01/10/2006
<b>Period covered - end date:</b>	30/09/2007
<b>Project start date:</b>	01/10/2006
<b>Project duration [months]:</b>	48
<b>Project coordinator name:</b>	Prof. Subir Sarkar
<b>Project coordinator organisation name:</b>	THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD
<b>Date of submission:</b>	14/09/2007

## SUMMARY OF THE RECRUITMENT DURING THE REPORTING PERIOD

**Contractor:** THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor:** LANCASTER UNIVERSITY

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor:** KING'S COLLEGE LONDON.

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

Anna Kostouki	ESR (<4 years)	EL-Greece	Yes	Female	01/11/2006	30/09/2007	Full Time	11.0
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**Contractor:** INSTITUT DE FISICA D'ALTES ENERGIES

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor:** RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAET BONN

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

Suchita Kulkarni	ESR (<4 years)	IN-India	No	Female	08/08/2007	30/09/2007	Full Time	1.75
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**Contractor:** LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor: NORDISK INSTITUT FOR TEORETISK FYSIK**

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					
Hael Collins	ER (4-10 years)	US-United States	No	Male	01/09/2007	30/09/2007	Full Time	1.0

**Contractor: EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH**

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor: HELSINGIN YLIOPISTO**

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					
Diana Battefeld	ESR (<4 years)	US-United States	No	Female	01/09/2007	30/09/2007	Full Time	1.0

**Contractor: UNIVERSITY OF IOANNINA.**

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor: ISTITUTO NAZIONALE DI FISICA NUCLEARE**

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor: UNIVERSITE DE PARIS VII DENIS DIDEROT**

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor:** CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					
Wessel Valkenburg	ESR (<4 years)	NL-Netherlands	No	Male	01/11/2006	30/09/2007	Full Time	11.0

**Contractor:** UNIWERSYTET WARSZAWSKI

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

**Contractor:** SEOUL NATIONAL UNIVERSITY

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR					

## TOTAL PMM PER CONTRACTOR

**Contractor:** THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
0.0

**Contractor:** LANCASTER UNIVERSITY

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
0.0

**Contractor:** KING'S COLLEGE LONDON.

**No. of full-time equivalent months to be delivered according to the contract:** 12

No. of full-time equivalent months covered by this recruitment during this reporting period
11.0

**Contractor:** INSTITUT DE FISICA D'ALTES ENERGIES

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
0.0

**Contractor:** RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAET BONN

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
1.75

**Contractor:** LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
0.0

**Contractor:** NORDISK INSTITUT FOR TEORETISK FYSIK

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

1.0

**Contractor:** EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

**No. of full-time equivalent months to be delivered according to the contract:** 6

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** HELSINGIN YLIOPISTO

**No. of full-time equivalent months to be delivered according to the contract:** 6

No. of full-time equivalent months covered by this recruitment during this reporting period

1.0

**Contractor:** UNIVERSITY OF IOANNINA.

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** ISTITUTO NAZIONALE DI FISICA NUCLEARE

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** UNIVERSITE DE PARIS VII DENIS DIDEROT

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)

**No. of full-time equivalent months to be delivered according to the contract:** 12

No. of full-time equivalent months covered by this recruitment during this reporting period

11.0

**Contractor:** UNIWERSYTET WARSZAWSKI

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** SEOUL NATIONAL UNIVERSITY

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

## TOTAL PMM FOR ALL CONTRACTORS

No. of full-time equivalent months to be delivered according to the contract	No. of full-time equivalent months covered by this recruitment during this reporting period
36.0	25.75

## SUMMARY OF THE EMPLOYMENT FORECAST FOR THE NEXT REPORTING PERIOD

**Contractor:** THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Phillipp Mertsch	ESR (<4 years)	DE-Germany	No	Male	01/10/2007	30/09/2008	Other	0.0

**Contractor:** LANCASTER UNIVERSITY

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Narendra Sahu	ER (4-10 years)	IN-India	No	Male	01/10/2007	30/09/2008	Other	12

**Contractor:** KING'S COLLEGE LONDON.

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Anna Kostouki	ESR (<4 years)	EL-Greece	Yes	Female	01/10/2007	30/09/2008	Other	12.0

**Contractor:** INSTITUT DE FISICA D'ALTES ENERGIES

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Thomas Konstandin	ER (4-10 years)	DE-Germany	No	Male	01/11/2007	30/09/2008	Other	11.0

**Contractor:** RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAET BONN

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Eun Kyung Park	ER (4-10 years)	KR-Korea (Republic of)	No	Female	01/10/2007	30/09/2008	Other	12.0
Suchita Kulkarni	ESR (<4 years)	IN-India	No	Female	01/10/2007	30/09/2008	Other	12.0

**Contractor:** LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					

**Contractor:** NORDISK INSTITUT FOR TEORETISK FYSIK

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Hael Collins	ER (4-10 years)	US-United States	No	Male	01/10/2007	30/09/2008	Other	12

**Contractor: EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Charalampos Bogdanos	ESR (<4 years)	EL-Greece	Yes	Male	01/11/2007	29/02/2008	Other	4.0
Nicholas Harries	ESR (<4 years)	UK-United Kingdom	No	Male	01/11/2007	29/02/2008	Other	4
Lotta Mether	ESR (<4 years)	FI-Finland	No	Female	01/01/2008	30/04/2008	Other	4.0

**Contractor: HELSINGIN YLIOPISTO**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Diana Battefeld	ESR (<4 years)	US-United States	No	Female	01/10/2007	30/09/2008	Other	12
Gerasimos Rigopoulos	ER (4-10 years)	EL-Greece	Yes	Male	01/10/2007	30/09/2008	Other	12

**Contractor: UNIVERSITY OF IOANNINA.**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Nicolas Chatillon	ER (4-10 years)	FR-France	No	Male	01/10/2007	30/09/2008	Other	12.0
Katarzyna Zuleta	ER (4-10 years)	PL-Poland	Yes	Female	01/10/2007	30/09/2008	Other	12

**Contractor: ISTITUTO NAZIONALE DI FISICA NUCLEARE**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Eugeny Babichev	ER (4-10 years)	RU-Russian Federation	No	Male	01/12/2007	30/09/2008	Other	10.0

**Contractor: UNIVERSITE DE PARIS VII DENIS DIDEROT**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Wessel Valkenburg	ESR (<4 years)	NL-Netherlands	No	Male	01/10/2007	30/09/2008	Other	12.0

**Contractor: CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Paul Hunt	ER (4-10)	UK-United	No	Male	01/10/2007	30/09/2008	Other	12.0

**Contractor: UNIWERSYTET WARSZAWSKI**

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
Paul Hunt	ER (4-10)	UK-United	No	Male	01/10/2007	30/09/2008	Other	12.0



**Contractor:** UNIWERSYTET WARSZAWSKI

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					
	years)	Kingdom						
Ioannis Ntalianis	ESR (<4 years)	EL-Greece	No	Male	01/10/2007	30/09/2008	Other	12

**Contractor:** SEOUL NATIONAL UNIVERSITY

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	Working time commitment	No. of full-time equivalent months in the next reporting period
		Country	LFR					

## TOTAL PMM PER CONTRACTOR

**Contractor:** THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD

**No. of full-time equivalent months to be delivered according to the contract:** 24

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** LANCASTER UNIVERSITY

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

12.0

**Contractor:** KING'S COLLEGE LONDON.

**No. of full-time equivalent months to be delivered according to the contract:** 12

No. of full-time equivalent months covered by this recruitment during this reporting period

12.0

**Contractor:** INSTITUT DE FISICA D'ALTES ENERGIES

**No. of full-time equivalent months to be delivered according to the contract:** 24

No. of full-time equivalent months covered by this recruitment during this reporting period

11.0

**Contractor:** RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAET BONN

**No. of full-time equivalent months to be delivered according to the contract:** 24

No. of full-time equivalent months covered by this recruitment during this reporting period

24.0

**Contractor:** LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

**No. of full-time equivalent months to be delivered according to the contract:** 6

No. of full-time equivalent months covered by this recruitment during this reporting period

0.0

**Contractor:** NORDISK INSTITUT FOR TEORETISK FYSIK

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period

12.0

**Contractor:** EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

**No. of full-time equivalent months to be delivered according to the contract:** 6

No. of full-time equivalent months covered by this recruitment during this reporting period

12.0

**Contractor:** HELSINGIN YLIOPISTO

**No. of full-time equivalent months to be delivered according to the contract:** 18

No. of full-time equivalent months covered by this recruitment during this reporting period
24.0

**Contractor:** UNIVERSITY OF IOANNINA.

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
24.0

**Contractor:** ISTITUTO NAZIONALE DI FISICA NUCLEARE

**No. of full-time equivalent months to be delivered according to the contract:** 24

No. of full-time equivalent months covered by this recruitment during this reporting period
0.0

**Contractor:** UNIVERSITE DE PARIS VII DENIS DIDEROT

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
10.0

**Contractor:** CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)

**No. of full-time equivalent months to be delivered according to the contract:** 12

No. of full-time equivalent months covered by this recruitment during this reporting period
12.0

**Contractor:** UNIWERSYTET WARSZAWSKI

**No. of full-time equivalent months to be delivered according to the contract:** 24

No. of full-time equivalent months covered by this recruitment during this reporting period
24.0

**Contractor:** SEOUL NATIONAL UNIVERSITY

**No. of full-time equivalent months to be delivered according to the contract:** 0

No. of full-time equivalent months covered by this recruitment during this reporting period
0.0

## TOTAL PMM FOR ALL CONTRACTORS

No. of full-time equivalent months to be delivered according to the contract	No. of full-time equivalent months covered by this recruitment during this reporting period
174.0	177.0

## PROJECT ACHIEVEMENTS DURING THE REPORTING PERIOD

### Research Achievements

#### Research Activities

\* Organisation of or participation in and presentations to external specialist workshops and conferences

UniverseNet members have been involved in organising and/or giving key talks at 60 workshops and conferences. Please see Appendix 1 (Conferences and Schools) for detailed information.

\* Specialist exchange among Network Partners (number, nature, when, where, who)

There have been many such visits for collaborative work (however not all were reported with dates etc). For example N. Mavromatos (KCL) visited Athens U., CERN, and Paris U. while Z. Lalak (Warsaw U.), S. Lola (Patras U.) and K. Tamvakis (Ioannina U.) all visited CERN. A. Basboll (Aarhus U.) visited Oxford U. during 1 Sep-15 Dec 2006 resulting in Publication 49 and G. Ballesteros (Madrid U.) visited Oxford U. during May-30 Jun 2006 resulting in Publication 42.

\* Individual and joint publications, directly related to the work undertaken within the contract (number, references)

UniverseNet members have produced 161 relevant publications, 61 of which were inter-Team collaborations. Please see Appendix 2 (Publications) for full references.

\* Development of new scientific collaborations (number, references)

UniverseNet is helping to promote and sustain a variety of scientific collaborations across European theoretical physics groups investigating the fundamental physics which shaped our Universe. Fig. 1 (Appendix 3) graphically illustrates the breadth of these collaborations which have resulted in 61 publications this year.

\* Scientific awards and prizes obtained from the work directly related to the contract (number, details)

None (directly related to the contact).

\* Interest expressed in the Networks' dedicated Website

The website (<http://www-thphys.physics.ox.ac.uk/users/SubirSarkar/univnet.html>) which was set up initially has had 2,510 hits to date (1,759 unique visitors, 1,225 first time visitors returning). A new website on a different server was set up in April 2007 (<http://www.physics.ox.ac.uk/univnet/default.htm>) to better administer the project - this has had 2,788 unique visitors from around the world (see Fig. 2 in Appendix 3).

\* Visits of Senior Researchers from inside and/or outside the Network (number, name, place and time of visit)

There were many visits of senior members of UniverseNet to other Teams in the network. Several senior researchers from outside the network came to lecture at the annual school in Greece: Anthony Challinor (Cambridge), Ed Copeland (Nottingham), Johannes Knapp (Leeds), John Peacock (Edinburgh), Fernando Quevedo (Cambridge) and Pilar Ruiz-Lapuente (Barcelona).

\* Contacts with relevant academic users groups (number, name)

None.

\* General progress with research activities programmed at individual, participant team and Network

level

Overall the research activities proceeded according to plan - there were many papers written on the key objectives (dark matter, lepto/baryogenesis, inflation, string/M-theory cosmology, high energy cosmic rays & neutrinos). About 40% of these were inter-Team collaborations.

\* Highlights on particularly innovative developments (novel concepts, approaches, methods)

The highlights of research carried out by UniverseNet during its 1st year were discussed by the appointed Task Coordinators at the annual Network meeting and are available on the web ([http://www.physics.ntua.gr/cosmo07/UniNet/sci\\_prog.html](http://www.physics.ntua.gr/cosmo07/UniNet/sci_prog.html)):

Origin of matter (Quiros), Origin of dark matter (Drees), Origin of cosmic rays (Sigl), Origin of structure (Lyth), Origin of space-time (Rey).

\* Citation index for individual and joint publications directly related to the work undertaken within the contract

The citations received by each UniverseNet publication (both individual and joint) can be determined from their entries on the databases arXiv and SPIRES, as given on the webpage:

[http://www.physics.ox.ac.uk/universenet/universenet\\_publications.htm](http://www.physics.ox.ac.uk/universenet/universenet_publications.htm)

The papers were published in high impact factor international journals (Astropart. Phys., JHEP, Nucl. Phys. B, Phys. Lett., Phys. Rev., Phys. Rev. Lett., Science, etc)

\* Expected scientific breakthroughs

Concerning the task 'Origin of Cosmic Rays', there was a breakthrough by the Auger Collaboration (which includes UniverseNet members in Paris and Oxford) who established a significant correlation between the highest energy cosmic rays and active galactic nuclei which harbour supermassive black holes (Publication 7). This generated a great deal of interest in the media and the scientific community (see <http://www.auger.org/news/>)

\* Overall progress and possible problems encountered with individual work packages and/or Network-wide research activities

No problems encountered.

\* Nature and justification for adjustments, if any, to the original research work plan

None made.

\* Progress on cross interaction among disciplines represented within the Network

The annual school was focussed on both particle physics and astrophysics/cosmology and the participants were approximately equally divided between the disciplines. This generated plenty of coherent interactions.

\* Access to/use of state-of-the-art infrastructure and facilities

Not applicable.

\* Highlights on wider societal and/or ethical components of the project, such as public outreach activities

UniverseNet members have given many popular-level lectures to audiences of school children as well as the general public, and written several articles on new developments in the subject for both popular magazines and more specialised non-science journals. Please see Appendix 4 (Outreach) for detailed information.

\* Highlights on the scientific community recognition of the Network research contribution (awards, invitation to conferences, ...)

UniverseNet members have been invited to present their research at numerous conferences as keynote/plenary speakers. Please see Appendix 1 (Conferences and Schools) for detailed information.

## Training and ToK

### Training / Transfer of Knowledge (ToK) Activities

\* The rate of recruitment of ESR and ER for each participant and for the Network as a whole (ratio person-months filled/offered)

The summary of recruitment during the reporting period is shown below in terms of person-months delivered/person-months contracted for during the 1st year:

1. Oxford: 0/0
2. Lancaster: 0/0
3. KCL: 11/12
4. IFAE: 0/0
5. Bonn: 1.75/0
6. Muenchen:0/0
7. Nordita: 1/0
8. CERN: 0/6
9. Helsinki: 1/6
10. Ioannina:0/0
11. INFN:0/0
12. Paris VII: 0/0
13. CNRS: 11/12
14. Warsaw:0/0
15. Seoul: 0/0

Total: 25.75/36

Fig. 3 (Appendix 3) shows the breakdown of ESR-ER person-months of training already delivered and to be delivered in the coming years.

\* The nature and justification for adjustments, if any, to the original overall number of person-months of ESR and ER as well as to the breakdown of this overall number among the participants (see table contained in Part C)

None

\* The time and duration of each individual appointment.

The time/duration of each individual appointment during the 1st year is given as months delivered/total duration of appointment:

1. Oxford, ESR Phillipp Mertsch (0/36)
2. Lancaster, ER Narendra Sahu (0/24)
3. KCL, ESR Anna Kostouki (11/36)
4. Barcelon, ER Thomas Konstandin (0/24)
5. Bonn, ESR Suchita Kulkarni (1.75/18)
6. Bonn, ER Eun Kyung Park (0/24)
7. Copenhagen, ER Hael Collins (1/24)
8. Helsinki, ESR Diana Battefeld (1/36)
9. Helsinki, ER Gerasimos Rigopoulos (0/24)
10. Ioannina, ER Nicolas Chatillon (0/24)

11. Ioannina, ER Katarzyna Zuleta (0/24)
12. Paris VII, ER Eugeny Babichev (0/24)
13. Annecy, ESR Wessel Valkenburg (11/36)
14. Warsaw, ER Paul Hunt (0/24)
15. Warsaw, ESR Ioannis Ntalianis (0/24)
16. CERN, ESR Lotta Mether (0/4)
17. CERN, ESR Nicholas Harries (0/4)
18. CERN, ESR Charalampos Bogdanos (0/4)

\* the number, names and level of involvement of senior researchers directly associated with the tutoring/supervision of the recruited ESR or ER, at each participant

Each ESR and ER has a local Supervisor as well as a "Mentor" (a senior person in another Team of the Network who they can turn to for independent help and advice)

19. Oxford, ESR: Phillipp Mertsch  
(Supervisor: Subir Sarkar; Mentor: Herbi Dreiner)
20. Lancaster, ER :Narendra Sahu  
(Supervisor: John McDonald; Mentor: Serguey Petcov)
21. KCL, ESR: Anna Kostouki  
(Supervisor: Nick Mavromatos; Mentor: Smaragda Lola)
22. Barcelon, ER: Thomas Konstandin  
(Supervisor: Mariano Quiros; Mentor: Christophe Grojean)
23. Bonn, ESR: Suchita Kulkarni  
(Supervisor: Manuel Drees; Mentor: Sacha Davison)
24. Bonn, ER: Eun Kyung Park  
(Supervisor: Manuel Drees; Mentor: Celine Boehm)
25. Copenhagen, ER: Hael Collins  
(Supervisor: Anupam Majudar; Mentor: Denis Comelli)
26. Helsinki, ESR: Diana Battefeld  
(Supervisor: Kari Enqvist; Mentor: Mairi Sakellariadou)
27. Helsinki, ER: Gerasimos Rigopoulos  
(Supervisor: Kari Enqvist; Mentor: Konstantinos Dimopoulos)
28. Ioannina, ER: Nicolas Chatillon  
(Supervisor: Kyriakos Tamvakis; Mentor: David Langlois)
29. Ioannina, ER: Katarzyna Zuleta  
(Supervisor: Kyriakos Tamvakis; Mentor: Ruth Gregory)
30. Paris VII, ER: Eugeny Babichev  
(Supervisor: Pierre Binetruy; Mentor: Krzysztof Meissner)
31. Annecy, ESR: Wessel Valkenburg  
(Supervisor: Julien Lesgourgues; Mentor: Krzysztof Meissner)
32. Warsaw, ER: Paul Hunt  
(Supervisor: Zygmunt Lalak; Mentor: Graham Ross)
33. Warsaw, ESR: Ioannis Ntalianis  
(Supervisor: Zygmunt Lalak)
34. CERN, ESR: Lotta Mether  
(Supervisor: Ignatios Antoniadis; home Supervisor: Kari Enqvist)
35. CERN, ESR: Nicholas Harries  
(Supervisor: John Ellis; home Supervisor: Graham Ross)
36. CERN, ESR: Charalampos Bogdanos  
(Supervisor: Antonio Riotto; home Supervisor: Kyriakos Tamvakis)

\* The number of ESR that are expected to present their PhD thesis and when

Not applicable.

\* The number and place of the short visits and secondments undertaken by each individual ESR or ER either within or outside of the Network

Wessel Valkenburg is involved in collaboration with the Spanish team of UniverseNet while Anna Kostouki has made exploratory visits to the Greek team.

\* Number of visits of the ESR and ER to their home scientific community

Anna Kostouki attended the annual HEP conference of the Hellenic Society in Athens and gave a talk there.

\* Attendance at Network meetings by the ESR and ER (number, names, place, date)

Thirteen ESR and ER attended the 1st UniverseNet annual School/Meeting held in Mytilene, 24-29 September 2007 and most of them gave talks on their research (all available on the webpage [http://www.physics.ntua.gr/cosmo07/UniNet/sci\\_prog.html](http://www.physics.ntua.gr/cosmo07/UniNet/sci_prog.html))

E. Babichev: Non-canonical scalar fields, superluminal propagation and black holes

D. Battefeld: Magnetogenesis from Cosmic String Loops

A. Kostouki: A novel world-sheet renormalization group and non-critical strings ...

C. Bogdanos: Bulk matter and cosmic acceleration

P. Hunt: Multiple Inflation and the WMAP Glitches

T. Konstandin: Status report on electroweak baryogenesis

E-K. Park: Dark Matter Detection in Supersymmetric Models ...

G. Rigopoulos: Decoherence from isocurvature perturbations in inflation

W. Valkenburg: What do WMAP and SDSS really tell about inflation?

The others who attended were S. Kulkarni, P. Mertsch, K. Zuleta, and Y. Daliyanis. During the Network annual meeting on 29 September, all of the ESR and ER present gave brief presentations about their research background (available on the web at [http://www.physics.ntua.gr/cosmo07/UniNet/sci\\_prog.html](http://www.physics.ntua.gr/cosmo07/UniNet/sci_prog.html))

Participation in and presentations to workshops and conferences by ESR and ER (number, names, place, date)

Both Anna Kostouki and Wessel Valkenburg attended the Cargese Summer School in "Cosmology and Particle Physics Beyond the Standard Models" (August 2007)

Wessel Valkenburg attended three international conferences ("ENTAPP Dark Matter Workshop" at CERN, March 2007, "Outstanding questions for the standard cosmological model" at Imperial College London, March 2007, and COSMO 07 at the University of Sussex, August 2007). He presented talks in these events, plus one invited seminar at the University of Geneva, one presentation at JLAC11 (Geneva) and another one at CERN's cosmology journal-club.

\* Organisation of training events (e.g. schools, training workshop/seminar, hands-on training session on specialised instrument/techniques) at individual participant sites (number, attendees' names, place, date)

Durham University: NUMMI'0, Neutrino Mass Measurements and their Implications, Durham, 10 - 12 Jan 2007, 34 participants.

Warsaw University: 2nd Workshop on Particle Physics and Cosmology: the Interface, 15-18 Feb 2007, Warsaw, 43 participants.

Warsaw University: PLANCK 07: From the Planck Scale to the Electroweak Scale, 9-13 Jun 2007, Warsaw, 153 participants.

SISSA-INFN: From Quantum to Emergent Gravity: Theory and Phenomenology, 11-15 Jun 2007, Trieste, 70 participants.

CERN: ENTApP Visitor Programme and Workshop on Dark Matter, Geneva, 5-9 Mar 2007, 58 participants.

CERN: Summer Student Lecture Programme, Geneva, 4 Jul-15 Aug 2007, 173 participants.

CERN + APC Paris: Preparatory workshop for the Astroparticle Roadmap Phase II, Paris, 19-20 Jul 2007, 47 participants.

CERN: New Physics and the LHC, Geneva, 13 Aug-7 Sep 2007, 86 participants.

CERN: LHC - Cosmology interplay, Geneva, 25 Jun-10 Aug 2007, 40 participants.



Liverpool University: BSM 2007, Liverpool, 29-30 Mar 2007, 52 participants.  
IFAE: Mariano-fest, Barcelona, 25 May 2007, 82 participants.

Aarhus Univ: The Path to Neutrino Mass, Aarhus, 3-6 Sep 2007.

Oxford Univ: Postgraduate Skills Training for Mathematical, Physical and Life Sciences Division (e.g. networking, time management, mentoring and coaching, and others skills training courses), Oxford, for full list see <http://www.learning.ox.ac.uk/>

\* Organisation of Network-wide training events (number, attendees' names, place, date)

Ioannina U. + NTU Athens: Fourth Aegean Summer School on Black Holes, Mytilene, 17-22 Sep 2007, about 50 participants.

CNRS: Gravitational Waves and Experimental Gravity, La Thuile, 11-18 Mar 2007.

CERN: Cosmology and Particle Physics Beyond the Standard Models, 30 Jul-11 Aug 2007, Cargese, 77 participants.

INFN: Highlights in Physics Today, Milan, 16 Feb 2007.

INFN: 21st Les Rencontres De Physique De La Vallee D'Aoste, La Thuile, 4-10 Mar 2007, 109 participants.

INFN: XII International Workshop on Neutrino Telescopes, Venice, 6-9 Mar 2007.

INFN: KAON'07, Frascati, 21-25 May 2007, 116 participants.

INFN: String Phenomenology 2007, Frascati, 4-8 Jun 2007, 95 participants

INFN: International School on Astro-Particle Physics: Multi-messenger approach in high energy astrophysics, Seillac, 4-15 Jun 2007, 70 participants.

INFN : TeV Particle Astrophysics III, Venice, 27-31 Aug 2007, 124 participants

NORDITA: 5th Nordic Winter School in Particle Physics and Cosmology, Gausdal, 7-12 Jan 2007, 40 participants.

Nordita: Cosmology, Strings, and Phenomenology, Stockholm, 15-20 Jun 2007, 129 participants.

IFAE: 19th Conference on High Energy Physics, Naples, 11-13 Apr 2007, 161 participants.

\* Number, place, purpose of any meeting (e.g. workshop) organised by the ESR or ER themselves

Wessel Valkenburg is helping in the organization of "Journées des Lacs Alpains" meetings and the forthcoming Benasque Workshop on Modern Cosmology, July 2008.

\* General progress with training and ToK activities programmed at individual, participant team and Network level (type of guidance, supervision, coaching or Mentoring in place to support ESR and ER)

Each ESR/ER benefits from the training programme of the host institution (advanced lectures, seminars, colloquia etc) plus interactions with other members of their Team, in addition to the individual guidance provided by their Supervisors. They are also each assigned a Mentor (in a different Team) who keeps track of their progress and advises on professional development - appropriate Mentors are selected by the Co-ordinator in consultation with the Supervisors.

\* Highlights on the development of particularly innovative approaches to training and ToK (e.g. specific training packages of Network-wide relevance)

The annual school had lectures by both astrophysical and particle cosmologists, thus enabling the students (who were roughly equally divided between the two categories) to appreciate the difference in perspective towards common problems in cosmology and the joint efforts being made by the two sides to arrive at satisfactory solutions.

\* Highlights on the exploitation of the "complementarities" between Network participants with respect to training and ToK

None

\* Nature and justification for adjustments, if any, to the original training/ToK (e.g. opportunities for new collaborations regarding training activities)



None

\* Career development plans as elaborated by the ESR and ER involved in the project

These have been provided already for each ESR/ER appointed - the CDPs of the two ESRs (Kostouki and Valkenburg) appointed in the 1st yr are attached herewith.

\* Career development opportunities/prospects for ESR and ER involved in the project

The host institutions provide plenty of opportunities for the ESR and ER to become involved in graduate teaching, organising seminars and workshops, outreach activities etc, in addition to giving talks at other institutions and international meetings to raise their visibility.

\* achievements regarding the acquisition of complementary skills such as communication, language skills, computer skills, project management, ethics, team building, etc.

All ongoing at present (will report next year).

\* achievements regarding the training/ToK on specialised instruments/equipment

At our annual school there were about 160 participants about half of whom were postdocs and students from outside the network. Many of them had a background in astrophysics rather than in particle physics (as is the case for members of UniverseNet)

\* level of satisfaction of the trainees (e.g. as expressed in response to questionnaires)

No questionnaires circulated so far (but no complaints received so far)

## Management

### Management

\* effectiveness of the "internal" communication and decision making between the co-ordinator, team leaders, Supervisors, down to the ESR and ER, including feedback processes

Communication between the Co-ordinator and Team leaders was mainly through email and telephone. The annual network meeting provided an appropriate forum for open discussion both formally and informally between them as well as with other network members, in particular the ESR and ER appointed.

\* effectiveness of the communication between the Network and the Commission Services (frequency, efficiency, timely feedback), particularly regarding the conformance with contractual provisions and the implementation of contingency plans where needed

This was quite satisfactory since the Co-ordinator maintained close contact with the Scientific Officer in charge who provided advice and guidance when requested.

\* Network self-assessment through benchmarking activities (exchange of best practices among participants and/or development of ad hoc performance indicators regarding cost management, staff selection, measurement of research/training/ToK outputs, young researchers' involvement, etc.)

This will be done at the mid-term review meeting.

\* overall quality and efficiency of the "external" communication strategy of the Network (CORDIS; personal, team and Network web sites updates; newsletters; etc.)

The network website was kept up-to-date with all relevant information by the Administrator. She posted all network vacancies on CORDIS, compiled and maintained mailing lists, provided help and advice to the ESR/ER and also produced two excellent newsletters which were circulated to all

UniverseNet members:

[http://www.physics.ox.ac.uk/universenet/bulletin\\_july07.pdf](http://www.physics.ox.ac.uk/universenet/bulletin_july07.pdf)

[http://www.physics.ox.ac.uk/universenet/bulletin\\_april2007.pdf](http://www.physics.ox.ac.uk/universenet/bulletin_april2007.pdf)

We have experienced some problems with the SESAM form editing page as it seems to have bugs when calculating the number of person-months for ESRs and ERs. This has been acknowledged by the help desk (who are indeed helpful) and will hopefully be corrected soon - meanwhile some of the numbers in this report under "Recruitment Forecast" do not match what was provided by us in the CPFs. The correct numbers are given in Appendix 3 in a Table.

\* Effectiveness of the recruitment strategy of the Network in terms of equal opportunities (including gender balance) and open competition at international level

All UniverseNet positions were widely advertised and specified that applications from women are particularly encouraged. The effectiveness can be judged from the fact that typically 10-30 applications were received for each position and 6 of the 18 ESR and ER appointed so far are women. The selection process was transparent in that the application material of all the short-listed applicants plus the deliberations of the selection committee in each Team were made available to other Team Leaders on the restricted access webpage.

## DEVIATIONS/MODIFICATIONS TO THE ORIGINAL WORK PROGRAMME

Please indicate if the project

a) is, at this stage, being implemented as originally planned

If you answered b) or c) please include a detailed description of the modifications in the report (one page)

## ADDITIONAL INFORMATION

Please indicate any additional information, which may be considered useful to assess the work done during the reporting period.

Our Team in Denmark experienced a change since NORDITA moved to Stockholm and the UniverseNet members at NORDITA moved to the adjacent Niels Bohr Institute (which is managed by Copenhagen University). Accordingly we have followed the required procedures and requested a change of Contractor and provided all the necessary documentation. The Team Leader and the Extended Team members in Denmark remain the same and there is no change in the work plan.

Our network administrator has joined the association of EC project Managers in the UK (ECPMA, <http://go.warwick.ac.uk/ecpm>) which consists of about 70 project managers/administrators and is a valuable forum to share experiences, develop good practice and protocols applicable to the management of EU-funded projects. The aim is to create a platform (meetings, virtual groups) where members can pose questions, make suggestions, input ideas, share their experiences, and generally discuss improving project management activities. During the two annual meetings, invited speakers present different topics related to FP6 and FP7 (e.g. integration, communication, networking, gender issues, subcontracting, audits, software for project management, etc.). Ana will be presenting a talk in the next meeting to be held in Oxford on 12 December 2007.

<b>Attachments</b>	CDP_Valkenburg.pdf, CDP_Kostouki.pdf, Appendix_4_outreach.pdf, Appendix_3_figures.pdf, Appendix_1_conferencesSchools.pdf, Appendix_2_publications.pdf
<b>Name</b>	
<b>Date</b>	
<b>Signature</b>	