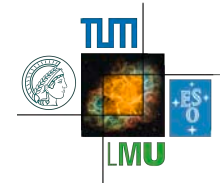
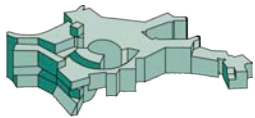


The “Universe” at the Deutsches Museum

IYA2009 exhibition project

Barbara Wankerl

Excellence Cluster Universe



Outline

- Motivation/Project History
- Conception
- Realisation
- Outlook



Source: KB Media/Ausstellungsgestaltung Die Wert

The Deutsches Museum

- One of the most renowned technical and science museums worldwide
- Close to 1 Million visitors in 2008



Source: Deutsches Museum

Astronomy exhibition

- Exhibition space: 1100 square meters
- Classical astronomy: From our solar systems out to the objects in the distant Universe
- Planetarium shows
- Up to then: no defined space for cosmology



Source: Deutsches Museum

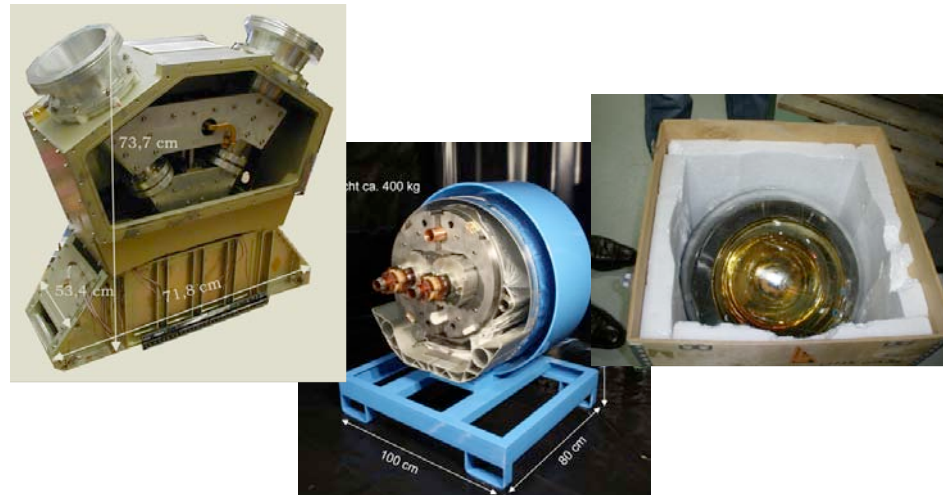
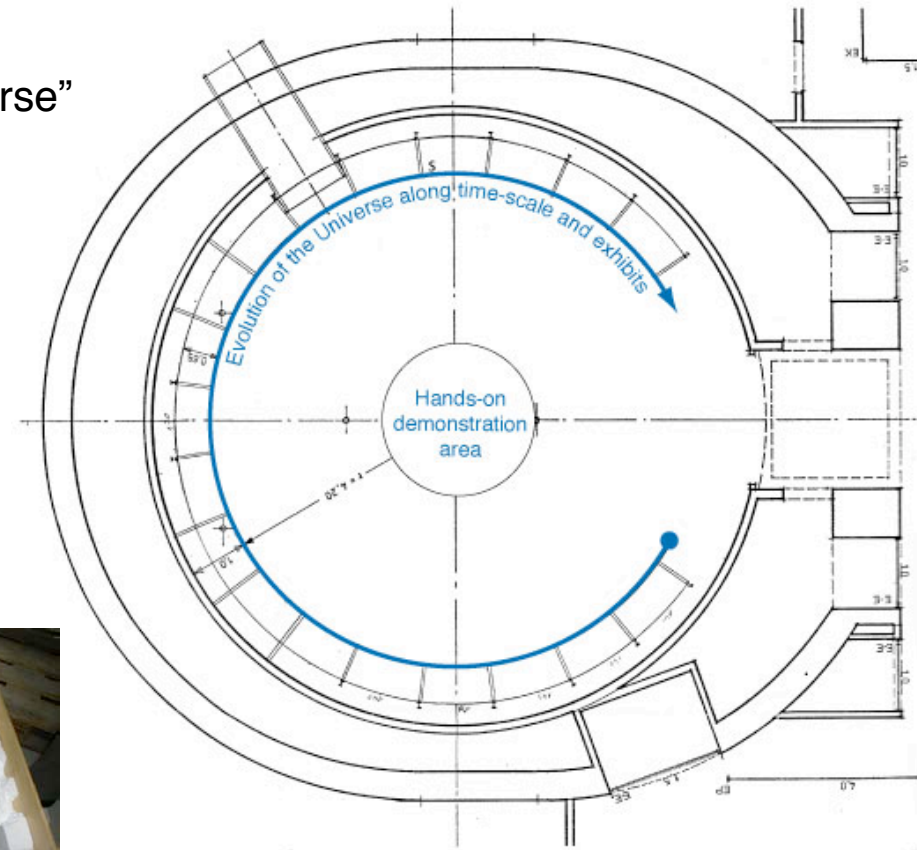
Start phase

- 100 sqm space available
- First meeting on 27 October 2009
- Definition on project scale
- Decision on co-operation with professional exhibition partner
- Financial planning and decision by 7 January 2009
- Kick-off meeting on 4 February 2009



General conception

- Theme and title: “The evolution of the Universe”
- Basic layout of the room
- Decision on “hands-on”-exhibits
- “Universe cinema” central attraction
- Integration of exhibits provided by the Deutsches Museum



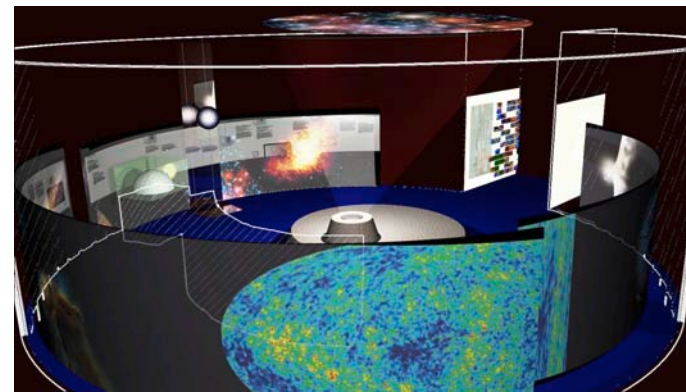
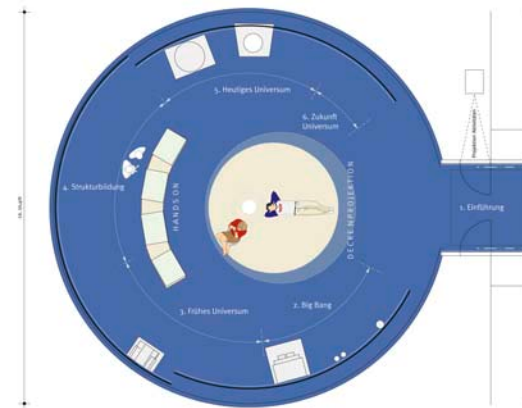
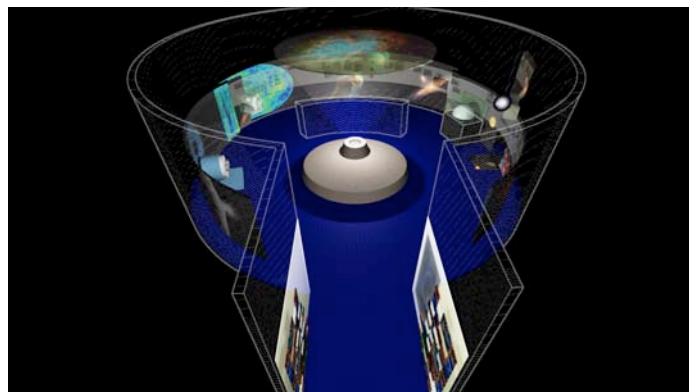
Material Collection

Stage	1) Big Bang up to 10 ⁻⁵ seconds	(2) The early Universe (up to 10 ³ seconds)	(3) Structure Formation	(4) Present Day Astronomy	(5) The Future of the Universe
Stations	Forces and Grand Unified Theories	Primordial nucleosynthesis	Dark Matter	Planetary Systems	Cosmic acceleration and Dark Energy
	Quark-Gluon plasma	Radiation decoupling, Planck spectrum, CMB	Formation and collision of galaxies	Star Formation and Death/Heavy Elements	
	Particle formation	The dark ages	Galaxy clusters	Galaxies/Milky Way, Super-massive Black Holes (AGN)	
Hands-on demonstration at the center	Symmetry breaking with a ball in a flexible parabolic structure	Cosmological redshift	Gravitational Lensing (available through DM)	Production sites of familiar chemical elements in stars and the Universe	
		Diese Übersicht zeigt alle möglichen Materie- und Energieformen im Universum. Um sie zu unterscheiden benutzt man den sogenannten w-Parameter, der die Zustandsgleichung			UC, B. Wankel
(max. 1 per stage)		CMB and structure formation			
Exhibits at/near wall	LHC accelerator model (available)	tbd	tbd	tbd	tbd
	Matter/antimatter symmetry breaking: Boxes filled with sand of different color				

(4) Structure Formation							
Station	Object Bild, Video, Grafik, Objekt)	Explanation	Status	Picture	Provider (institute, name, e-mail)	URL	Length, Width, Height, Weight
4.1. Dunkle Materie	Video: dunkle Galaxienhalos	Simulation der Bildung einer dunklen Materiehalos einer Galaxie wie Milchstraße ("Aquarius Simulation")	vorhanden		MPA; mpetkova, volker (at mpa-garching.mpg.de)		
	Bild-Exponat	CRESST-Kristalle mit Gehäuse (szintillierenden CaWO4 Targetkristall) Phonon/Licht Detektormodul aus Gran Sasso Untergrundlabor. Betrieb bei etwa 0.01 K, um nach Teilchen der Dunklen Materie zu suchen	Liegt Dt. Museum vor		MPP, Franz Probst, proebst@mppmu.mpg.de		4 cm Durchmesser, Kristall: 300 g
	Video: lensing mov	Animation zur Wirkungsweise einer Gravitationslinse	vorhanden		MPE		
	Grafik: Energieverteilung im Universum	Diese Übersicht zeigt alle möglichen Materie- und Energieformen im Universum. Um sie zu unterscheiden benutzt man den sogenannten w-Parameter, der die Zustandsgleichung charakterisiert. Gewöhnliche Materie hat den w-Parameter null, Licht hingegen 1/3.			UC, B. Wankel		
Station	Object Bild, Video, Grafik, Objekt)	Explanation	Status	Picture	Provider (institute, name, e-mail)	URL	Length, Width, Height, Weight
4.2. Sternentstehung	Videos zur Entstehung erster Sterne und Reionisation	Simulationen von T. Abel und T. Greif	kurzfristig beschaffbar		MPA, weiss (at mpa-garching.mpg.de)		
	Grafik: Sternentstehung und Sterntod		vorhanden		UC, B. Wankel	Cycle_of_matter_de.JPG	
	Bild: Sternentstehung	Bild von T. Abel	?		?		
	Bild: Gammastrahlenblitz		Quelle: GROND: muss beschafft werden.				

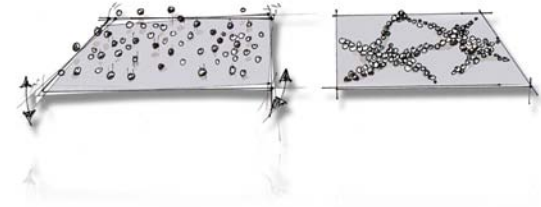
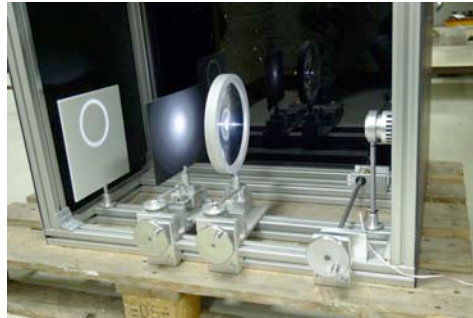
Realisation Phase

- Start: April 2009
- First layout plans by the Werft in May 2009

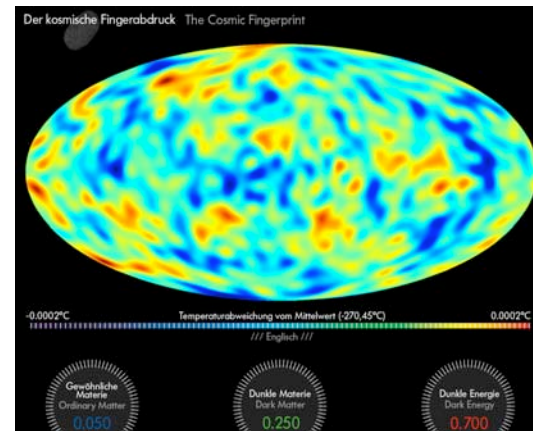
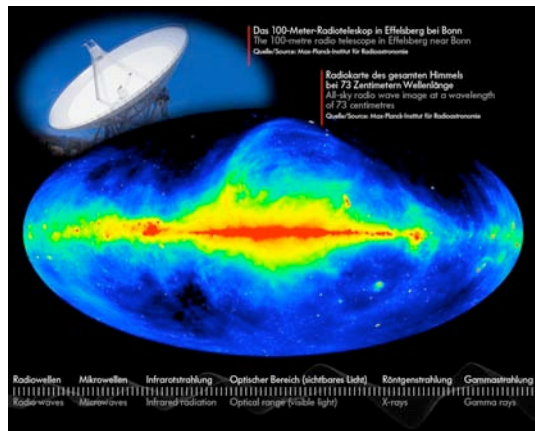


Source: Die Werft

Hands-on-exhibits



Die Werft

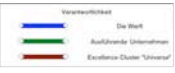
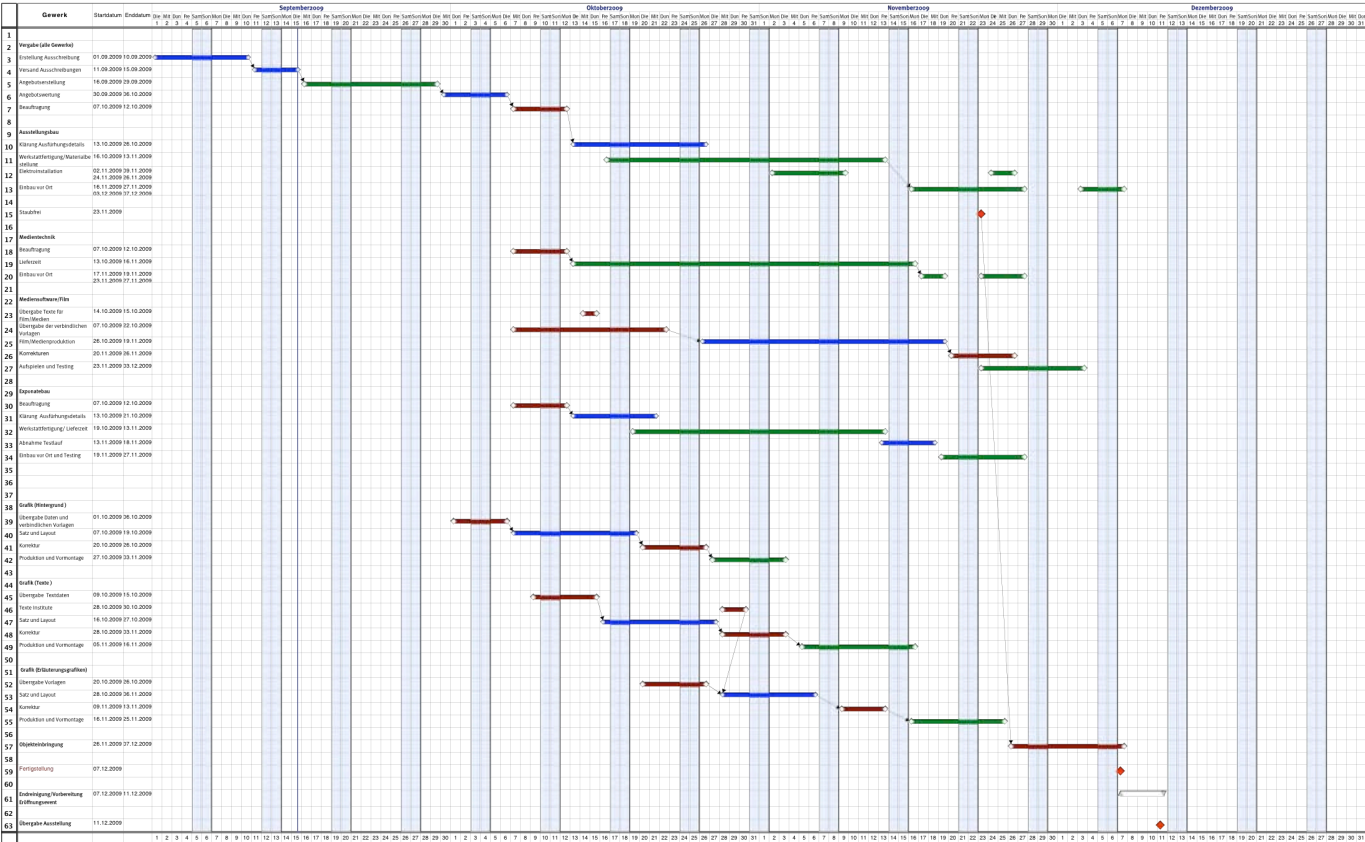


Source: Die Werft

Project plan

Terminplan Kosmologie

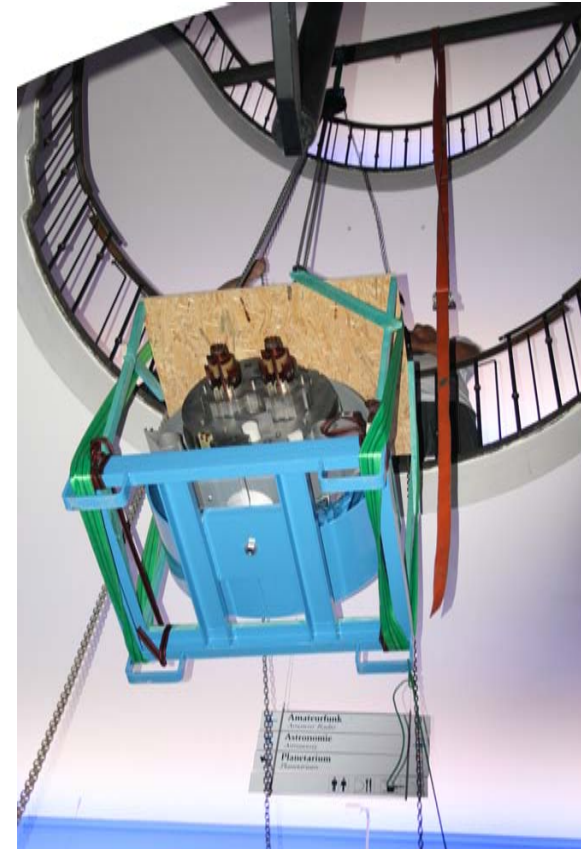
Stand: 09.09.2009



Impressions of the construction site I



Impressions of the construction site II



Tour through the exhibition



Source: Deutsches Museum

Detailed views



Sources: KB Media/Die Werft/
Deutsches Museum

Outlook

- Statement by Deutsches Museum for a permanent exhibition space
- Marketing/advertising in and outside the building
- Active use of the exhibition space
- Schools
- Visiting research groups
- Press Conferences
- Receptions



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