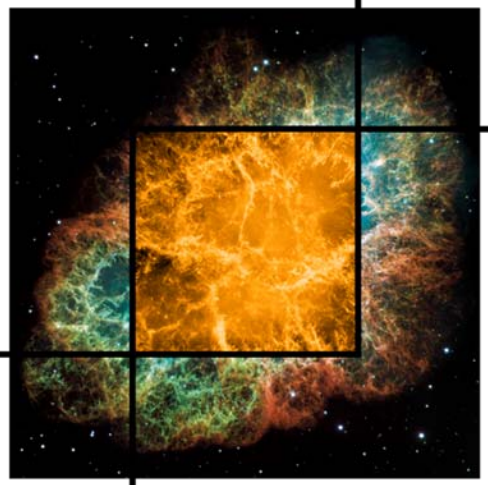


MAX-PLANCK-GESELLSCHAFT

LMU

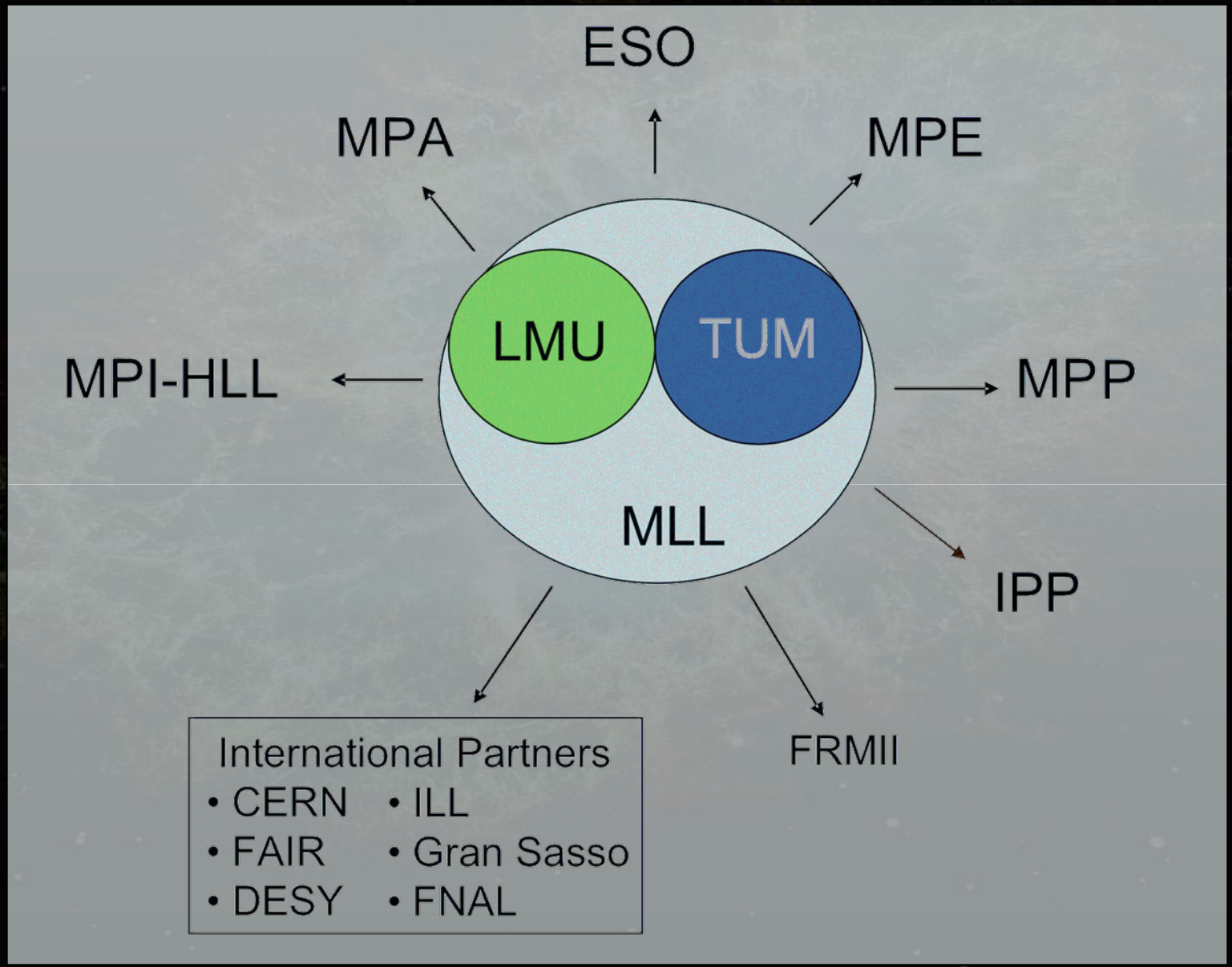
Excellence Cluster Universe

Key Features of the Cluster

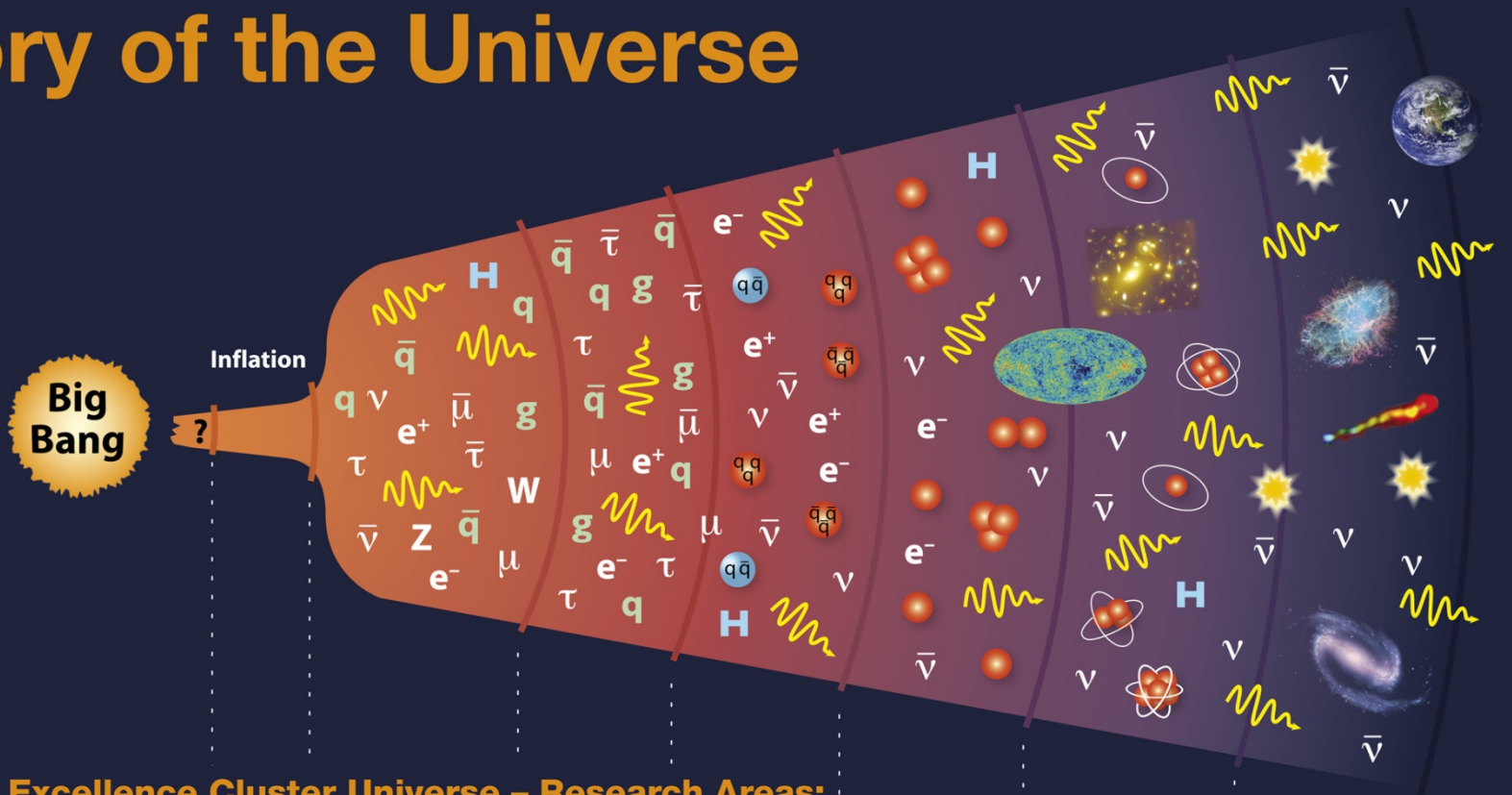
- 10 new junior research groups
- 2 New professors and 2 early reappointments
- New local research infrastructure
  - UCN source at FRMII (co-financing)
  - New Wendelstein Telescope Instrumentation (cameras)
  - Underground laboratory (extension)
  - GRID computing cluster

- Dedicated office building
- Integration into existing graduate schools
- Active measures to support gender equality & diversity
- Strong support of young scientists
- International program for guests and fellows
- Total volume: 39 M€

TUM&LMU and Scientific Institutes



History of the Universe

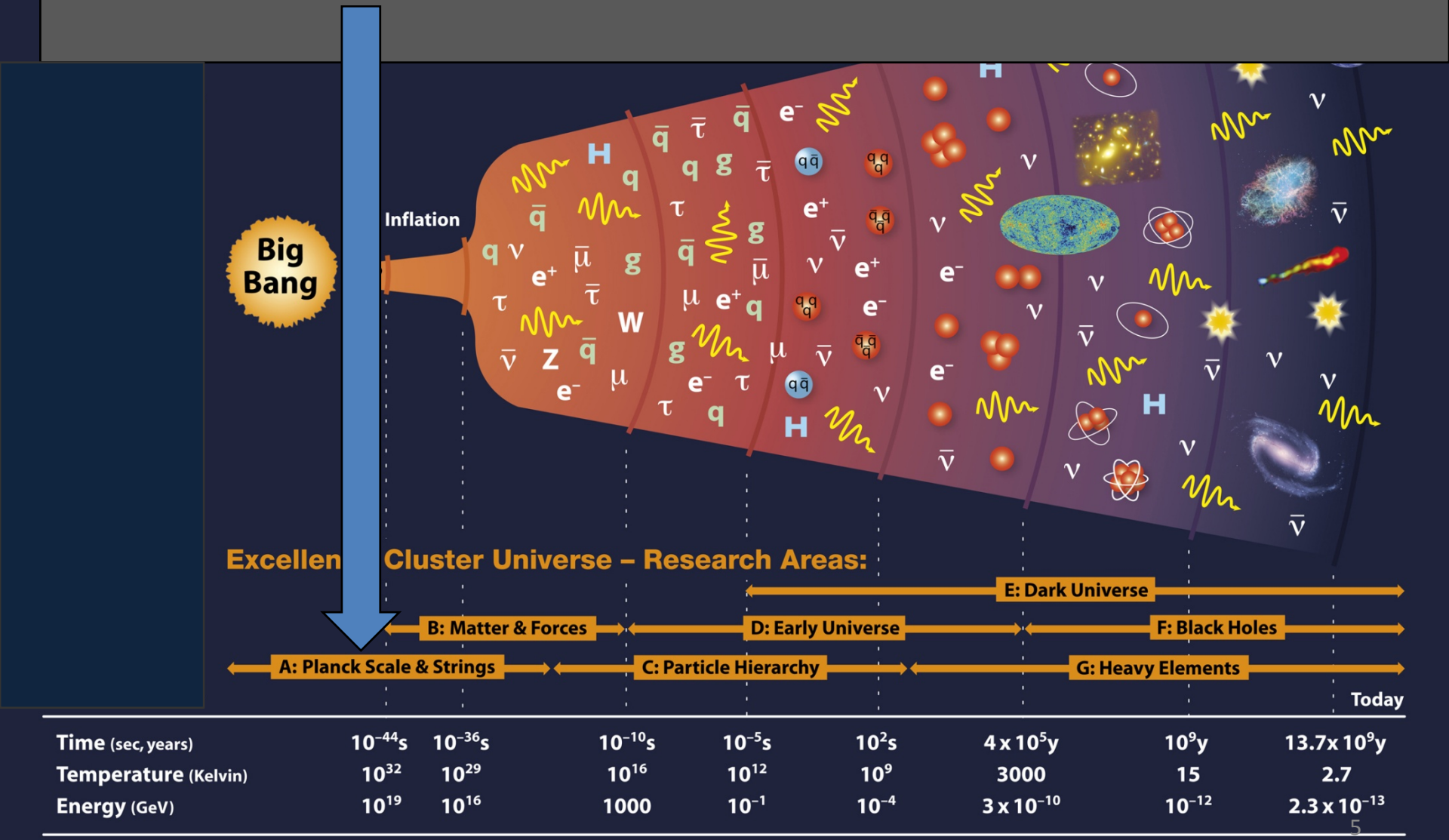


Excellence Cluster Universe – Research Areas:

- A: Planck Scale & Strings
- B: Matter & Forces
- C: Particle Hierarchy
- D: Early Universe
- E: Dark Universe
- F: Black Holes
- G: Heavy Elements

Time (sec, years)	10^{-44}s	10^{-36}s		10^{-10}s	10^{-5}s	10^{2}s	4×10^{5}y	10^{9}y	13.7×10^{9}y
Temperature (Kelvin)	10^{32}	10^{29}		10^{16}	10^{12}	10^{9}	3000	15	2.7
Energy (GeV)	10^{19}	10^{16}		1000	10^{-1}	10^{-4}	3×10^{-10}	10^{-12}	2.3×10^{-13}

How does matter behave at extreme high energies and short distances?



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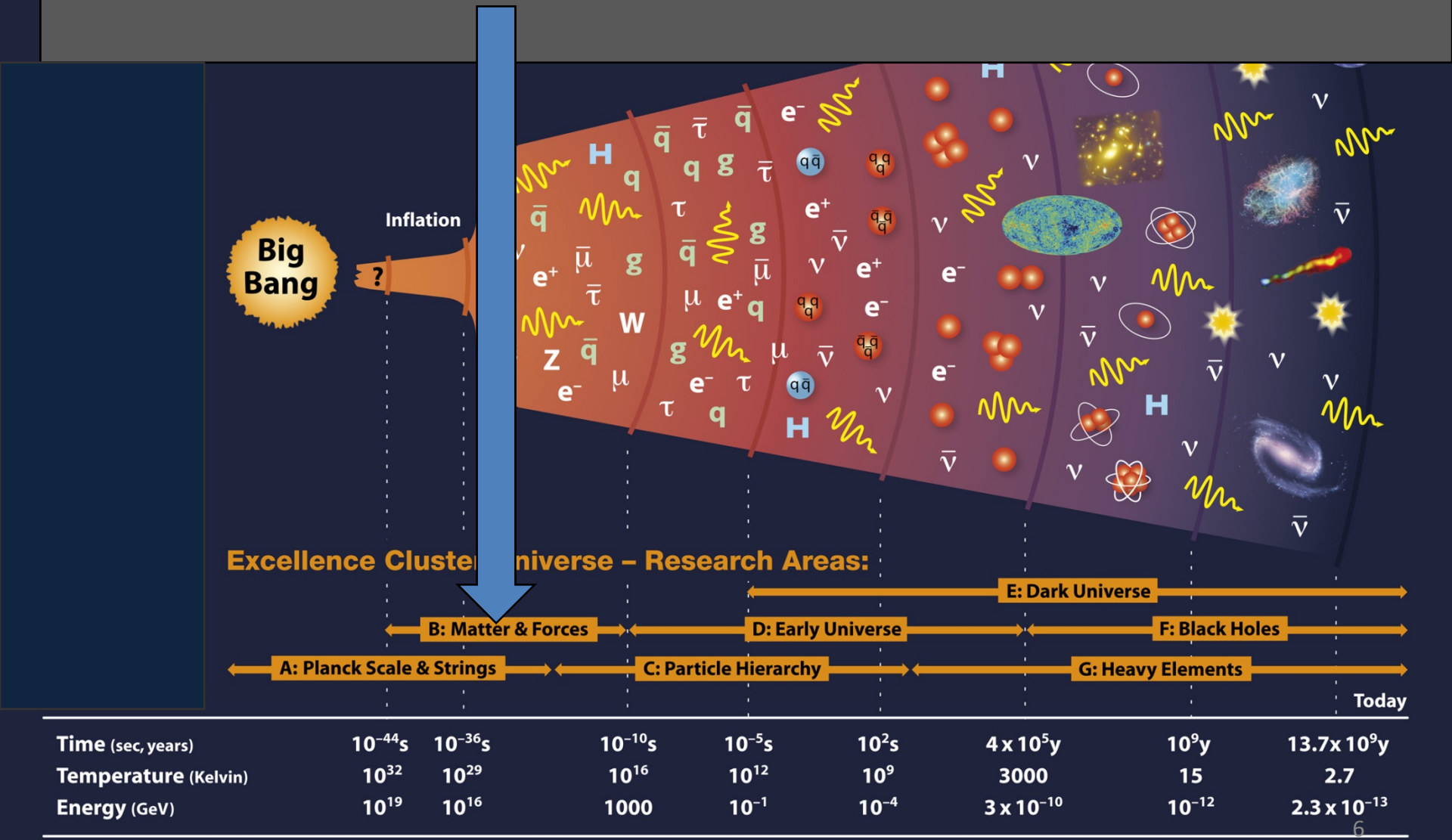
Is there symmetry between matter and forces ?



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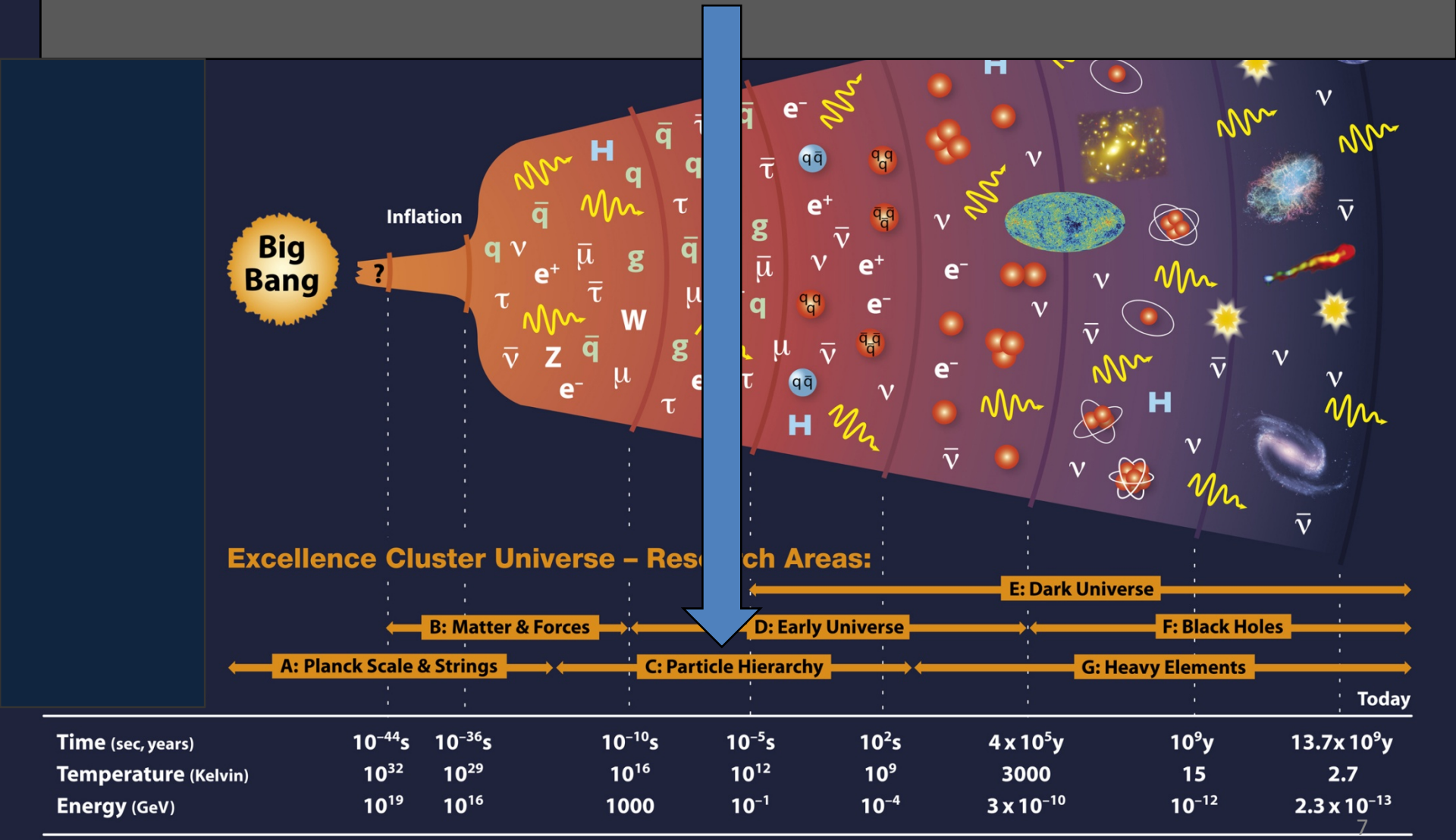
What is the origin of particle masses and the reason for their hierarchy ?



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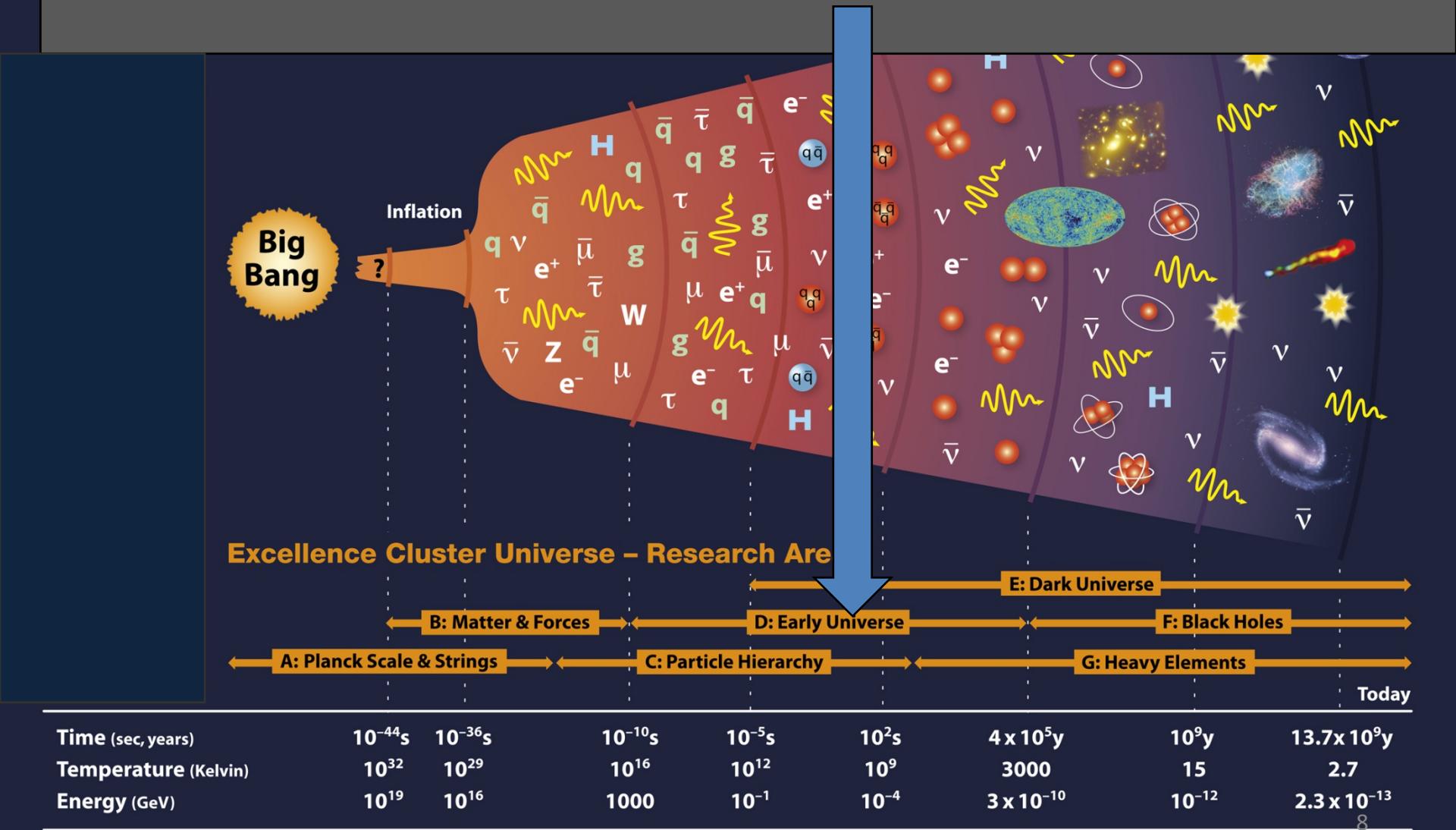
What are cosmic phase-transitions and what is the origin of matter in the universe ?



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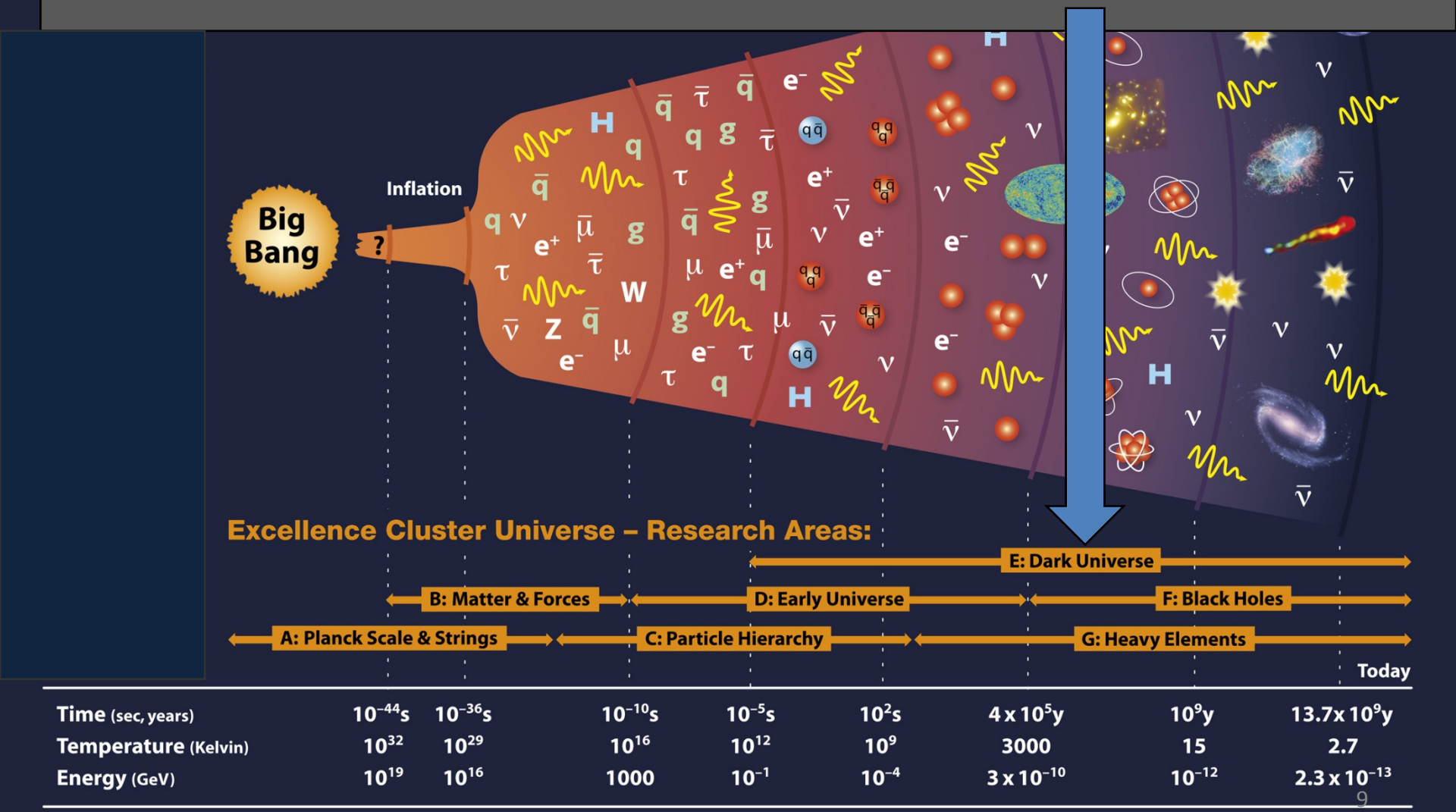
What are the dark components of the universe?



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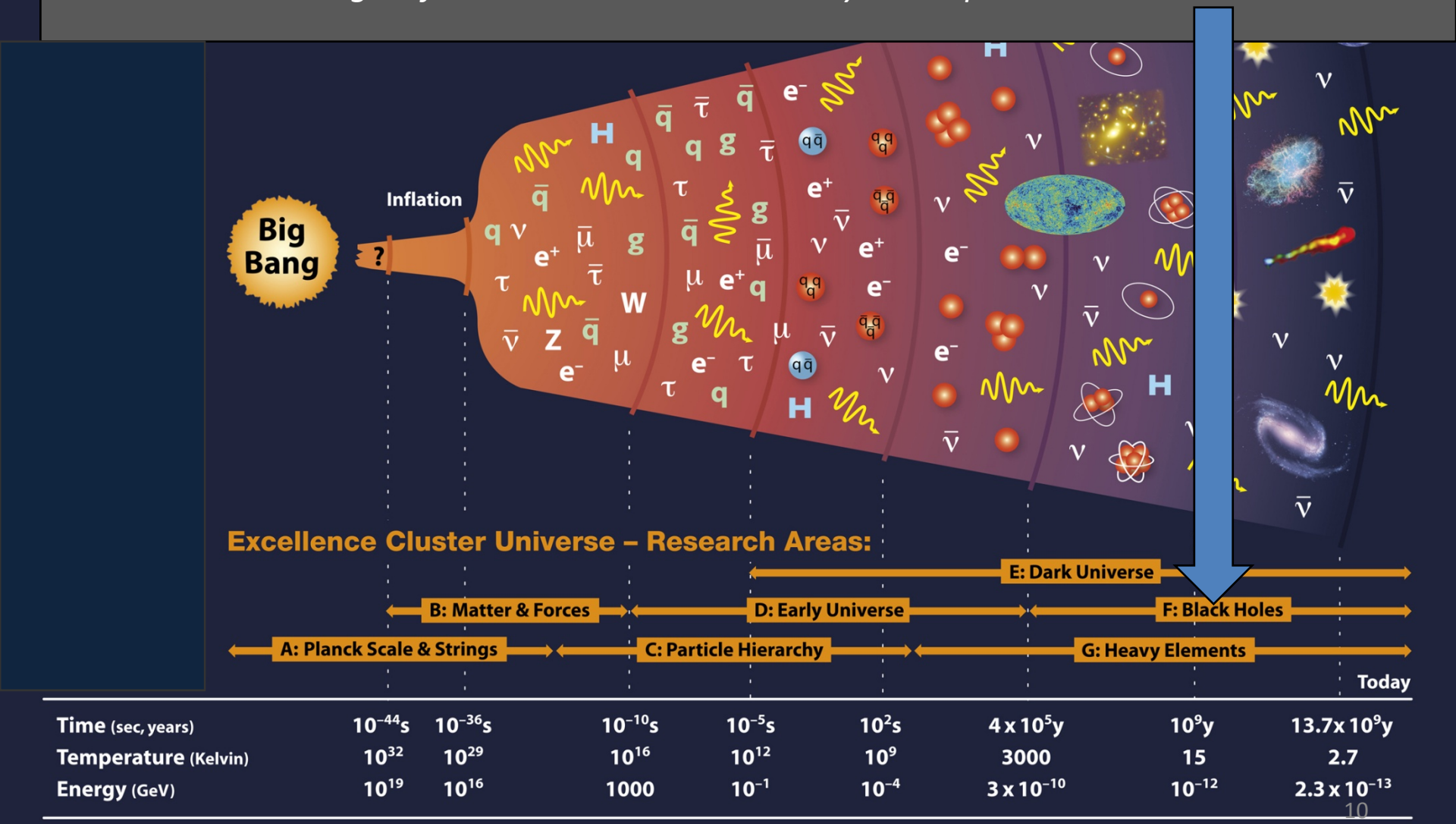
What is the Origin of black holes and how do they develop?



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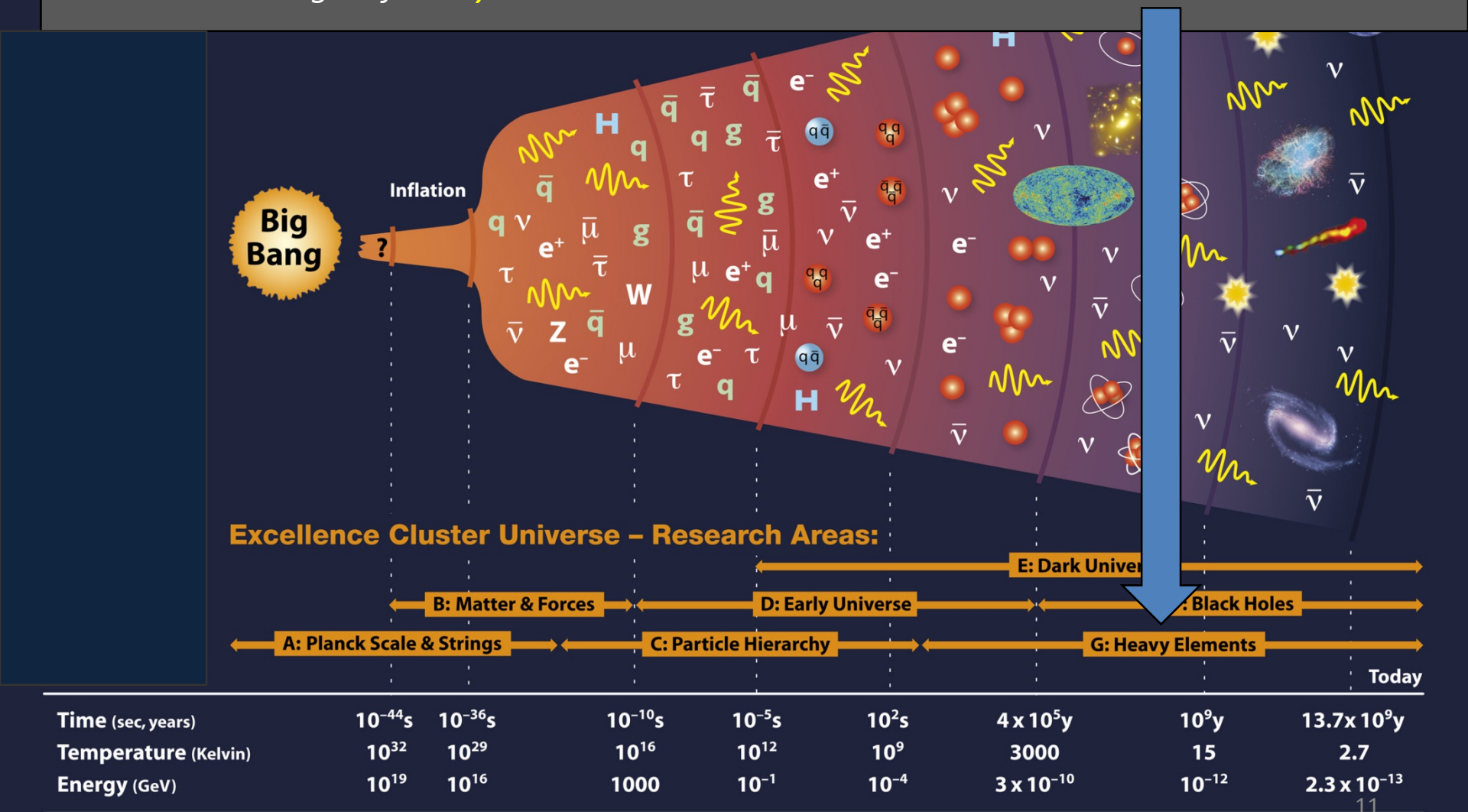
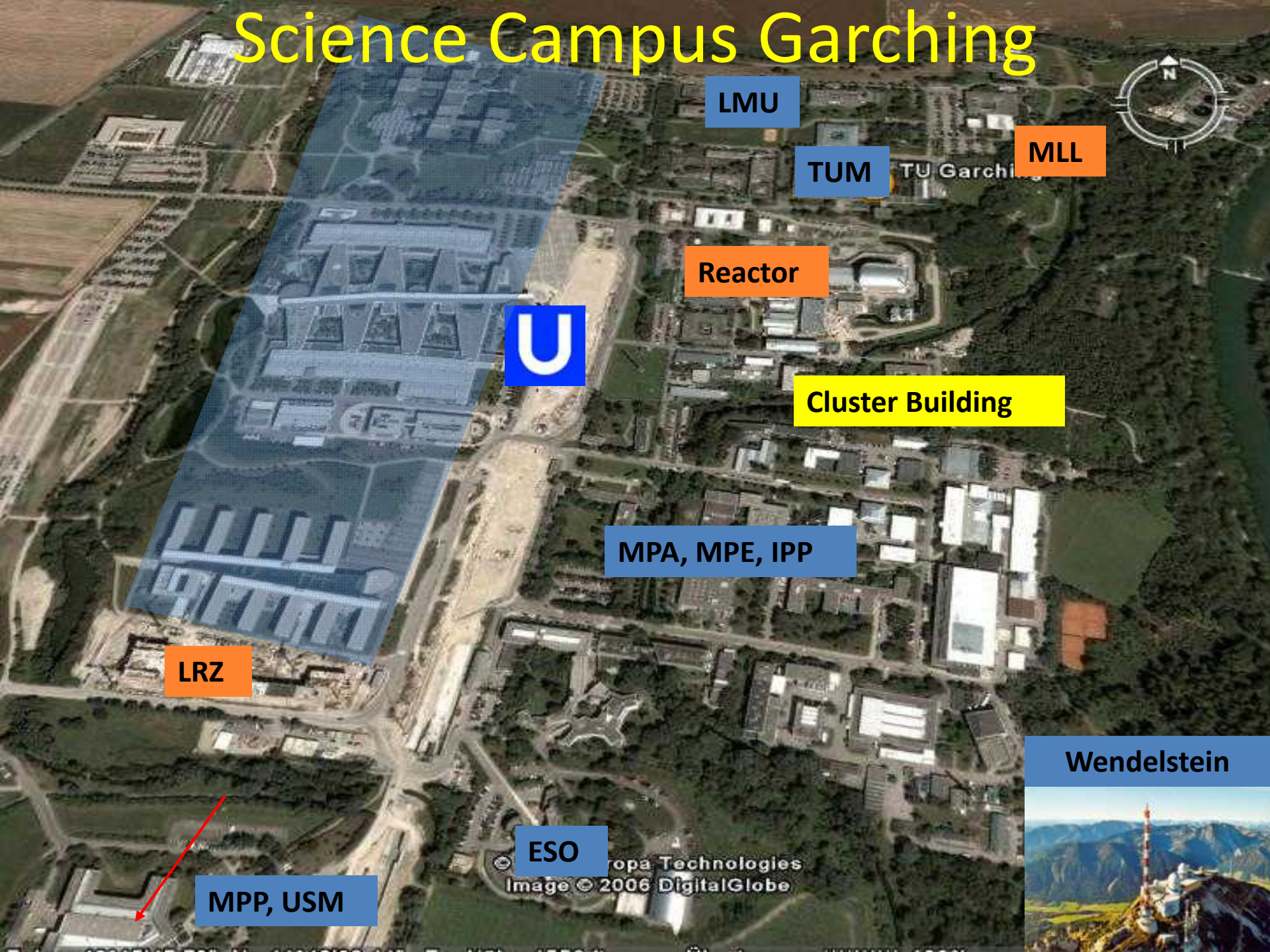
Energy (GeV)	10^{19}	10^{16}		1000	10^{-1}	10^{-4}	3×10^{-10}	10^{-12}	2.3×10^{-13}

What is the origin of heavy elements in the universe?



Science Campus Garching



Where are we after 13 months ?

Central Infrastructure/Administration

- Dedicated office building from IPP - ITER 2 (August)
  - 2 floors renovated
  - Basement includes large size laboratory for JRG's
  - In 2008 :
    - 1st floor in April
    - 2nd floor in August
- Administration built in summer 2007
- Cooperation agreement (TUM-LMU-MPG-ESO)
  - Long discussion
  - Document ready 11/2007

Our Admininstrative Staff

Katja Ketterle
Head of Administration

Andreas Müller
Scientific coordinator

Barbara Wankerl
Public Outreach Coordinator

Alexandra Wolfelsperger
Associate

Andreas Weiss –IT (since December 1st 07)
Sonja Kraus - Accounting
Claudine Voelcker – Visitors program and assistant
Ulrike Ollinger – Media design

And where we are – Infrastructure I

- Wendelstein: Most of equipment ordered
  - Camera, apogees, lab-equipment (1.3 M€)
  - Aditonal funds allocated (135 k€)
- Underground laboratory: All funds allocated
  - Substantial underestimate of costs
  - Construction to be paid by cluster (1,1 M€)
  - Infrastructure and instrumentation by other funds
- UCN source : 50% of funds allocated
  - 1.2 M€ allocated so far
- Computing:
  - USM simulation cluster for star formation operational
  - GRID computing – 30% of funds allocated

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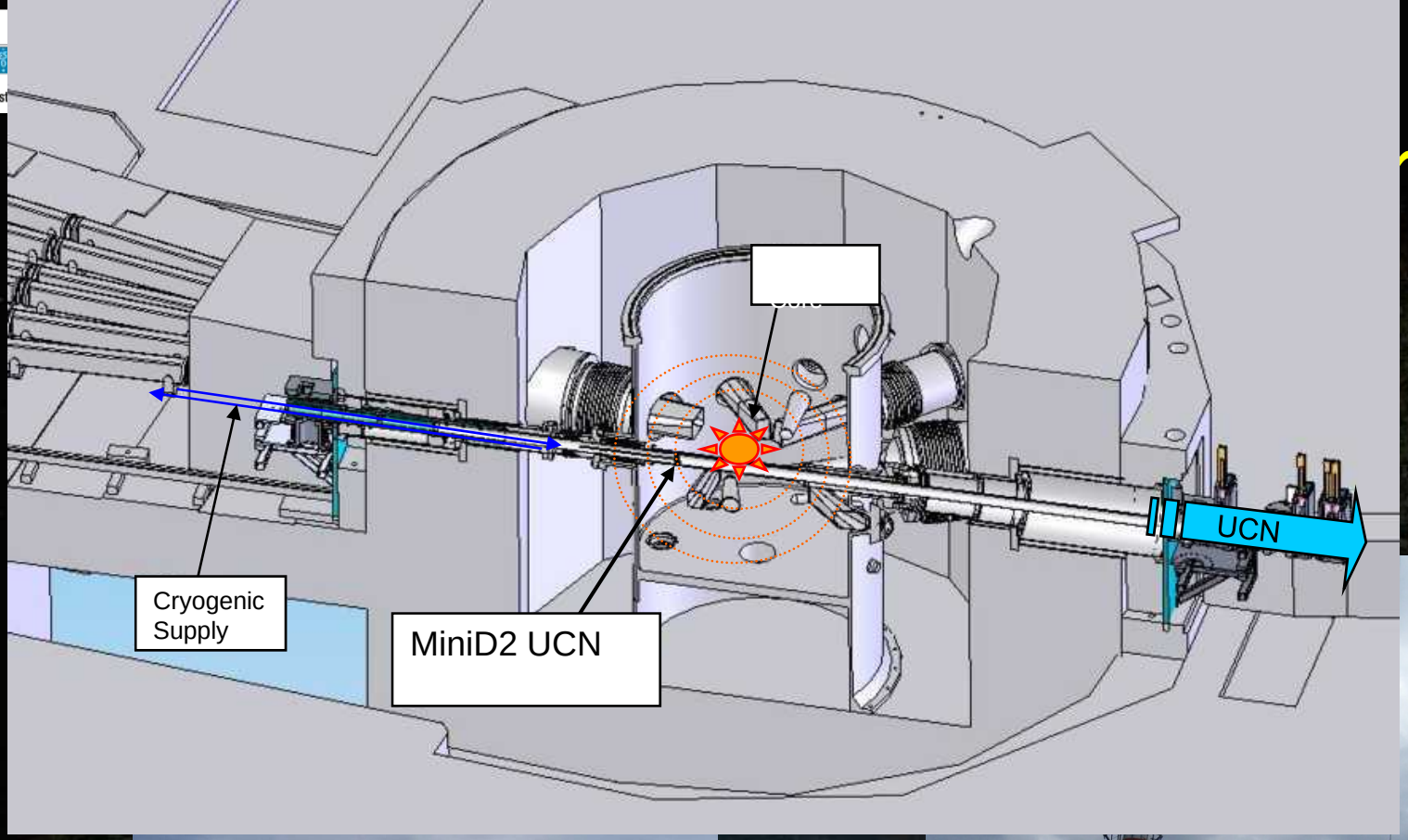

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And where we are – Infrastructure II

- Laboratory infrastructures
  - Major investment into local infrastructure done
    - Lab equipment (all institutions)
    - Electronic workshops
    - AMS at MLL upgraded
    - Fast internal cabling at USM
    - New instrumentation for crystal growth (GERDA)
  - JRG laboratory equipped

- General infrastructure
  - Theory/ESO: computing and libraries
  - Cluster building (infrastructure and rental fees)

New Instrumental Initiatives

- Support for Double-Chooz (Neutrino experiment - θ_{13}):
  - System for scintillator funded – Boosts Munich participation
- UCN experiments (particle physics with ultra cold neutrons)
  - n-Lifetime experiment (participation at magnet costs/design)
  - n-EDM (participation at magnetic shielding)
  - Gravitational level experiment
- CAST (Axion search)
  - new electronics

Personnel

- Positions available within the cluster (plan) – existing groups
  - Postdocs 10/5
  - PhD students 16/58

  During the year many positions for short term bridging used
- JRG (originally all W1)
  - 4 W1
    - F. Simon hired (MPP)
    - All others have offers to be decided upon
    - Profile: young scientists with few years postdoctoral experience
  - 6 W2
    - Selection ongoing – presently at faculty level
  - No PhD (20) or postdoctoral (10) positions used

Personnel II – Junior PI

Qualification:

- leader of small research group
- independent research project
- budget responsibility

… similar to JRG

Presently 22 JPI nominated

- Right of voting
- Small budget
- Proposal for research projects

Visitors program

- One long term visitor
- 22 short term visitors (1-3 months)
  - 12 Senior
  - 10 Junior
- 2 fellows (selection of next 3 ongoing)
  - First round: 8 applications
  - Second round: 27 applications
  - 5 new fellows/year – 2 year duration each

Public Outreach

In 2007

- Opening ceremony of the cluster (22-23 January)
- Opening of Cluster building (12 September)
- Night of Science in Garching (13 October)
- The universe at school (school cluster in Berchtesgaden)
- Lecture series in Dt. Museum
- Regular news and event updates

Plans:

- Exhibition: Cooperation with Dt. Museum
- Construction of spark chamber for public demonstration
- Stars for everybody – travelling telescope
- Teach the teachers, Further visits of schools
- Upgrade of Cluster Website
- Extension of Media Relations

Public outreach coordinator present since August

Academics and Science I

- Academics
  - Seminars : 220 announced since spring ‘07
  - Workshops: 10
    - Meetings of research areas
    - Topical workshops
  - Lectures
    - Instrumentation and techniques in particle, nuclear and astrophysics (ongoing)
    - Preparatory lectures for PhD students/Postdocs (summer ‘08)
      - Introduction to particle physics (for astrophysicists/astronomers)
      - Introduction to Astronomy (for particle and nuclear physicists)
    - Coherent lecture program at the Universities (3rd and 4th year students)
  - Symposia (2008)
    - Symmetries and Phases in the Universe (June 2008)
    - Hydrodynamical Instabilities and Turbulance (October 2008)

Academics and Science II

- Selected Research Highlights
  - RA A: Construction of string vacua and new brane solutions
  - RA B: first real time detection of solar neutrinos (BOREXINO)
  - RA C: First operation of a high yield UCN source at a TRIGA reactor
  - RA C: Minimal supersymmetric standard model: Most accurate prediction of Z-pole observables
  - RA E: Measurement of growth rate of cosmic structures at high redshift…
  - RA F: Detection of most massive stellar black hole (M33-X-7) with Chandra
  - RA G: First observation of ^{60}Fe in our galaxy
  - RA G: Progress in understanding neutrino driven core-collapse supernova in 2D simulations

……

Operation of the Cluster I

- Cluster constitution
- Budget
  - General budget
    - proposed by coordinators and
      - Includes nominal distribution of positions/travel/investment according to the discussion before submission of proposal
      - New JRG and full professors : startup funds
      - Major investments (according to proposal)
      - Junior PI (new) : small yearly budget
    - Additional investments/projects discussed and approved by RB
- Visitors program
  - List of proposed guests discussed and approved by RB

Operation of the Cluster II

- PhD and Postdoctoral positions: selection committee
- Fellows: 2 calls per year (30th April, 31st October)
  - Selection committee
  - Best candidates taken
  - Long term equalizing of field of work
- Small scale decisions by coordinators
  - operational basis
  - Directors fund

Problems

- Very short leadtime for cluster (2 weeks after funding decision)
  - Delays in hiring administrative staff
  - Delays in accounting infrastructure
- Recruitment of JRG leaders still takes one years (Slow system)
- Structural and cultural difference of LMU and TUM
  - Delays in cooperation agreement
  - Uncertainty in spending and accounting methods
  - Inhomogeneous hiring scheme (for JRG-leaders)
- Financial issues
  - Rigidity of spending by non-transferrable funds (year by year)
  - Budget cuts reinforced (2009-2011)
  - Unknown procedure for possible extension of clusters
  - High rental fees for cluster building (unexpected hard line of MPG)
- Salary scheme in public sector
- High competition for excellent scientists
  - industry, national and international academic competitors

Summary

Despite start up problems

- Very motivated staff
- Unprecedented financial conditions for
  - Young scientists
  - Visitor program
  - Public outreach
  - Other small spendings
- Substantial upgrade of technical infrastructure of universities ongoing
- Substantial investments into new research facilities
- Flexibility for funding of upcoming research projects

- Unprecedented interaction Astrophysics-Particle physics
- Further internationalization on the way
- Eagerly waiting for new JRG's