

Mid-term report Belgium

ECFA meeting at DESY, July 2014

Belgian ECFA members:

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Belgium (www.belgium.be)

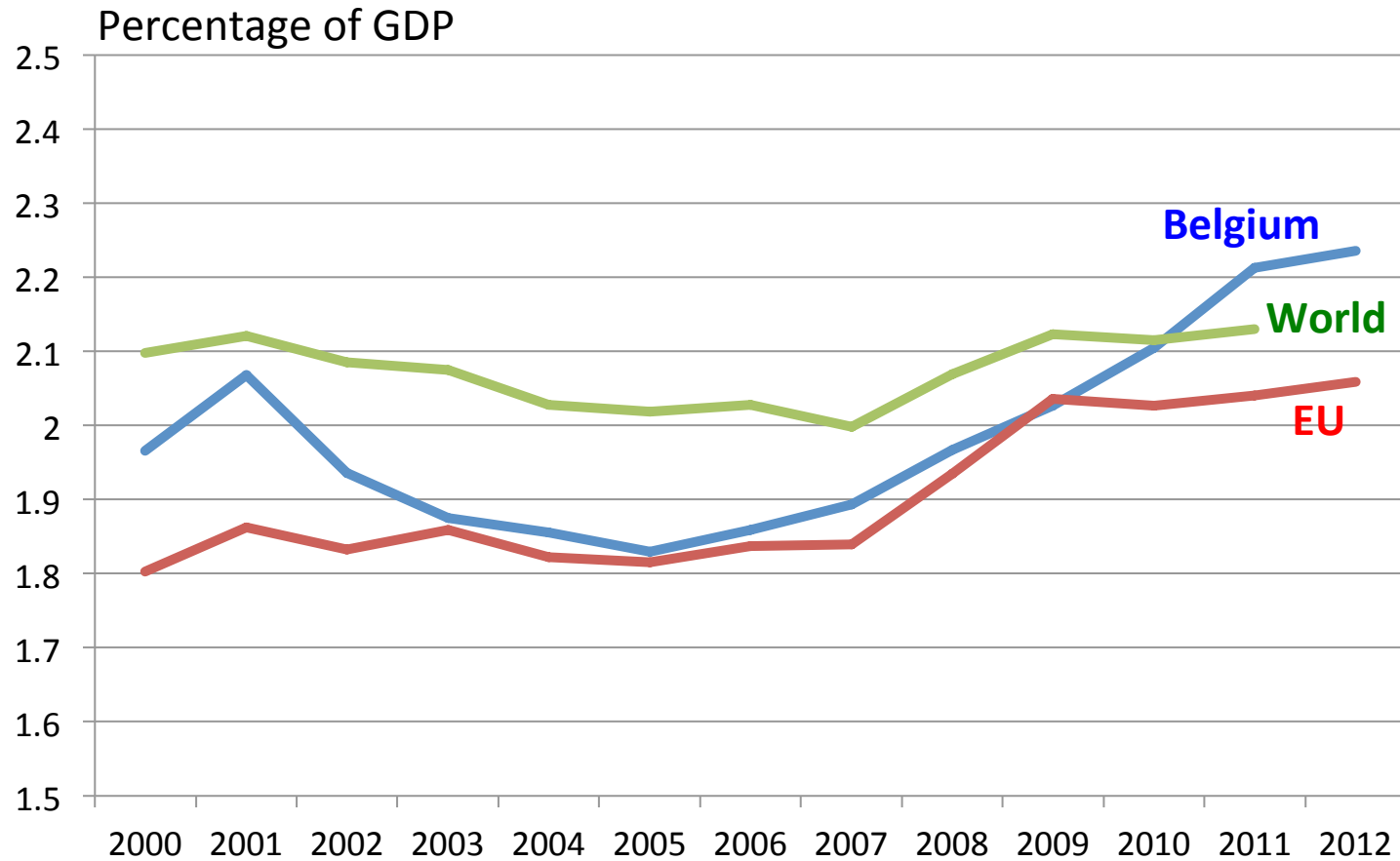
- 11,1 million inhabitants (anno 2013)
- 30528 km² (maximum distance between two points 280 km)
- Languages: Dutch, French, German
- GDP: 314 billions of EUR & 6.5% to education
- 6 governments, 589 municipalities
- Highest point: 694m
- One football team

GDP Annual Growth Rate



SOURCE: WWW.TRADINGECONOMICS.COM | NATIONAL BANK OF BELGIUM

Science & Development fraction of GDP



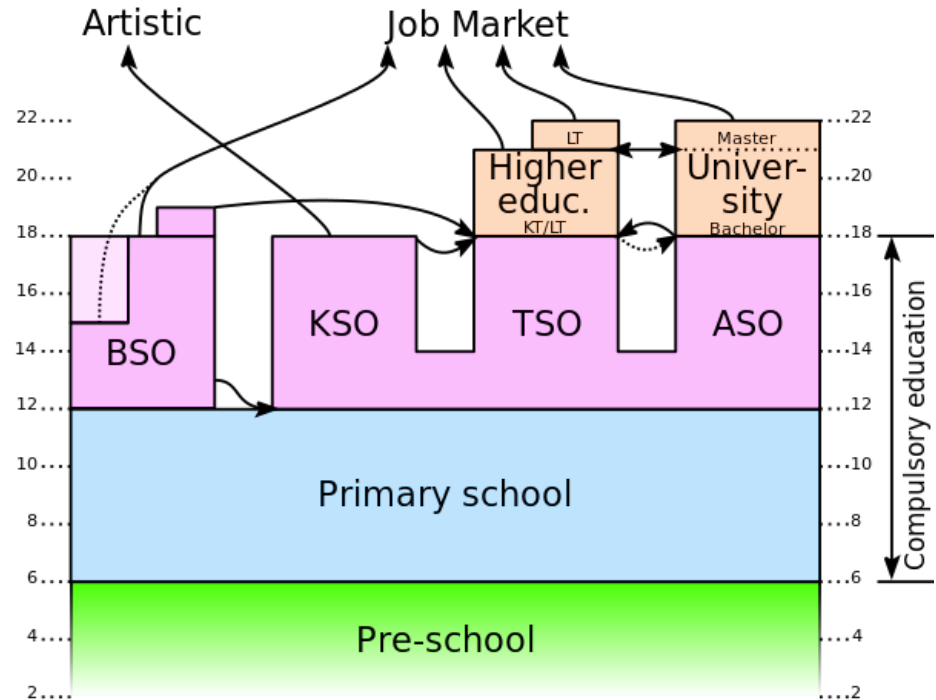
Governments in Belgium

- Federal state with regions (Flanders, Wallonia, Brussels-capital) and communities (Flemish, French, German speaking)
- Regions deal with infrastructure
- Communities with matters related to people and culture (incl. teaching and research)
- Tendency: more responsibilities from the Federal government towards the regions



Education

- Annual registration at universities 500-850 EUR
- 3 years for Bachelor degree, 1 or 2 years for Master
- Overall ~2% increase in students every year
- Strong increase in number of PhD students due to financing system with budget allocation relative to number of graduating PhD's



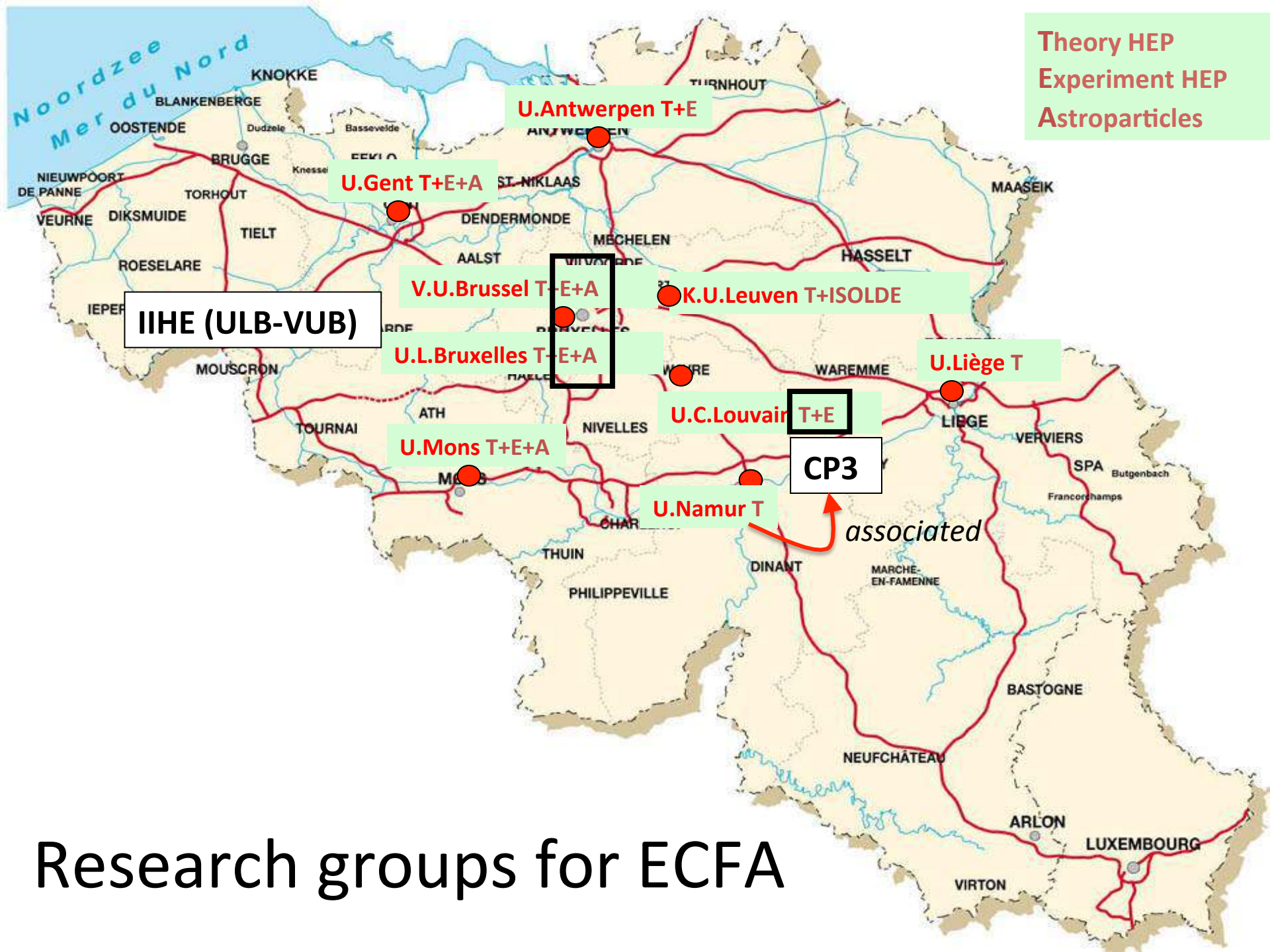
Universities for ECFA

- In total 14 universities (of which 7 appear on a top-200 list): from them 8 relevant for ECFA physics

- [Universiteit Gent](#)
- [Vrije Universiteit Brussel](#)
- [Universiteit Antwerpen](#)
- [Universite de Mons](#)
- [Universite Catholique de Louvain](#)
- [Universite Libre de Bruxelles](#)
- [Universite de Liege](#)
- [Katholieke Universiteit Leuven](#)



Theory HEP
Experiment HEP
Astroparticles



IIHE (ULB-VUB)

U. Antwerpen T+E

U. Gent T+E+A

V.U. Brussel T+E+A

K.U. Leuven T+ISOLDE

U.L. Bruxelles T+E+A

U. Liège T

U. Mons T+E+A

U.C. Louvain T+E

CP3

U. Namur T

associated

Research groups for ECFA

Past/Present experiments

- Past contribution: DELPHI, H1, OPERA
- Present*: CMS, IceCube, ISOLDE, GANIL/SPIRAL2, HIE-ISOLDE, PSI UCN, CALICE, RD57, Telescope Array, SoLid, Planck, ARA, NA62,...
- Key contributions in CMS:
 - Detectors: Tracker, Muons (RPC and GEM), CASTOR
 - Objects: Jets, b-tagging, tracking, tau's, e/gamma, muons
 - Analyses: H-boson, SUSY, Top, Exotica, B2G, Forward, SM
 - Two TIER-2's
- The disappearance of spin-off activities is still a worry

* More diversity was stimulated during the RECFA visit of 2010.

Human resources

Average:

- #PhD's since 2010 (incl 2010) = 76 (i.e. 17/year)
- On average between 4 and 4,5 years to complete the PhD
- #post-doc-years since 2010 (incl 2010) = 306 (i.e. 68/year)

Snapshot January 1st, 2014:

- #engineers = 10
- #technicians = 12,5
- #logistics/administration = 9
- #IT persons = 7
- Still a decreasing trend since RECFA visit to Belgium in 2010

Human resources

Snapshot January 1st, 2014:

		#professor-level	# post-docs	#PhD students
accelerator based	NA62	1	1	3
	CMS	15,6	38,9	41
	ISOLDE	6	11	13
	dosimetry	0,2	-	2
neutrino/astro-particle	IceCube	2,9	3,9	12
	SoLid	1	0,2	-
	ARA	0,5	1	1
	VLT	0,2	-	-
Pheno		3	11	7
Theory		20,2	35	38
Total	Many younger people ←	50,6	102	119

RECFA visit to Belgium 2010: 108 FTE in theory and 105 FTE in experiment

Mid-term report 2007: 89 FTE in theory and 87 FTE in experiment

Situation in 1995: 53 FTE in theory and 74 FTE in experiment

Financial resources – FWO

Flemish part

- Funding for fundamental research in Flanders
- PhD and post-docs mandates (competitive)
- No permanent research staff, but absorbed by universities as research professor mandates
- Projects (very competitive)
- Big Science program (selective): CMS & ISOLDE

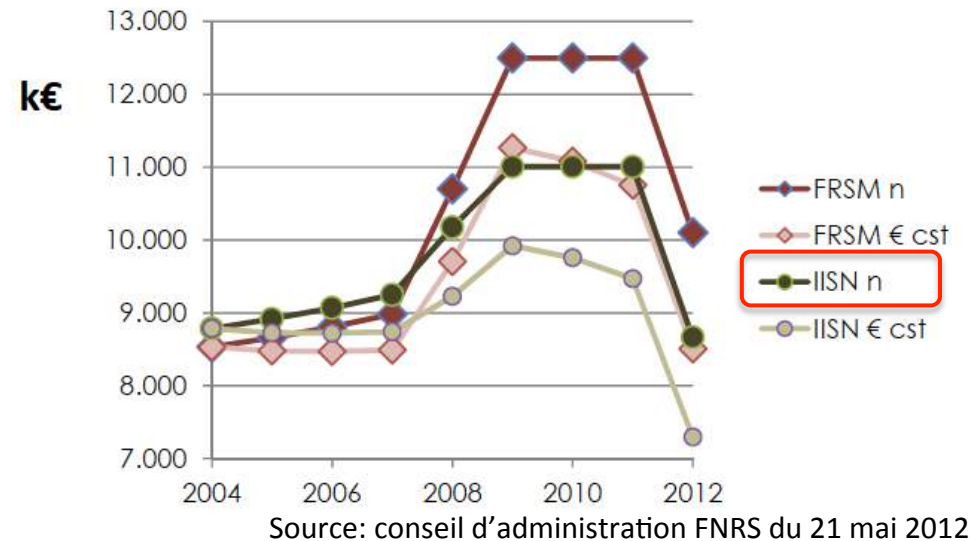
FWO-financing research at CERN (2005-2014)				
	CMS	ISOLDE	Total amount	Total budget
FWO-PhD (4y)	5	9	14	2,24 M EUR
FWO-postdocs (3-6y)	8	11	19	4,84 M EUR
Projects	23,66 M EUR	18,84 M EUR		42,50 M EUR
Total				49,58 M EUR

including ~4,9 M EUR competitive personal grants (ERC-like) to setup new teams

Financial resources – FNRS

French part

- IISN (*Institut Interuniversitaire des Sciences Nucleaires*)
- Important budget cuts last years (success rate for project application is reduced from ~45% to ~23%)
- The creation of a Big Science program for sustainable research at large infrastructures becomes very relevant



Financial resources – others

- University funding is competitive and selective, but we tend to be successful to obtain some (personal, scholarships, research professor mandates, project grants, concerted projects)
- EU COST, ERC, fellowships
- Hercules fund (Flanders) for local equipment
- International Solvay Institutes (for theory)

Financial resources – IUAP

- Funded by the federal government
- IUAP on Fundamental Interactions: a nation wide HEP collaboration between experiment and theory
 - 5,8 M EUR budget for 2007-2011 mainly to hire post-docs and PhD students
 - was successfully extended for 2013-2017 (5,1 M EUR)
- IUAP on BRIX (the Belgian Research Initiative on eXotic nuclei for atomic, nuclear and astrophysics studies)
 - 2,6 M EUR budget (2007-2011) and 3,1 M EUR (2012-2017)
- Beyond 2017 this responsibility will be in the hands of the regional governments

Some recent key positions in the field

- Vice-president of “CERN Council”
- Deputy spokesperson of CMS
- Chairperson of “CMS Collaboration Board”
- Chairperson of “CERN HIE Isolde Steering Committee”
- One member of CERN’s SPC
- MINIBALL Collaboration spokesperson
- Spokesperson of Crystal Clear Collaboration
- Several conveners of Physics groups in CMS and IceCube

Nobel Prize – Francois Englert



Conclusion

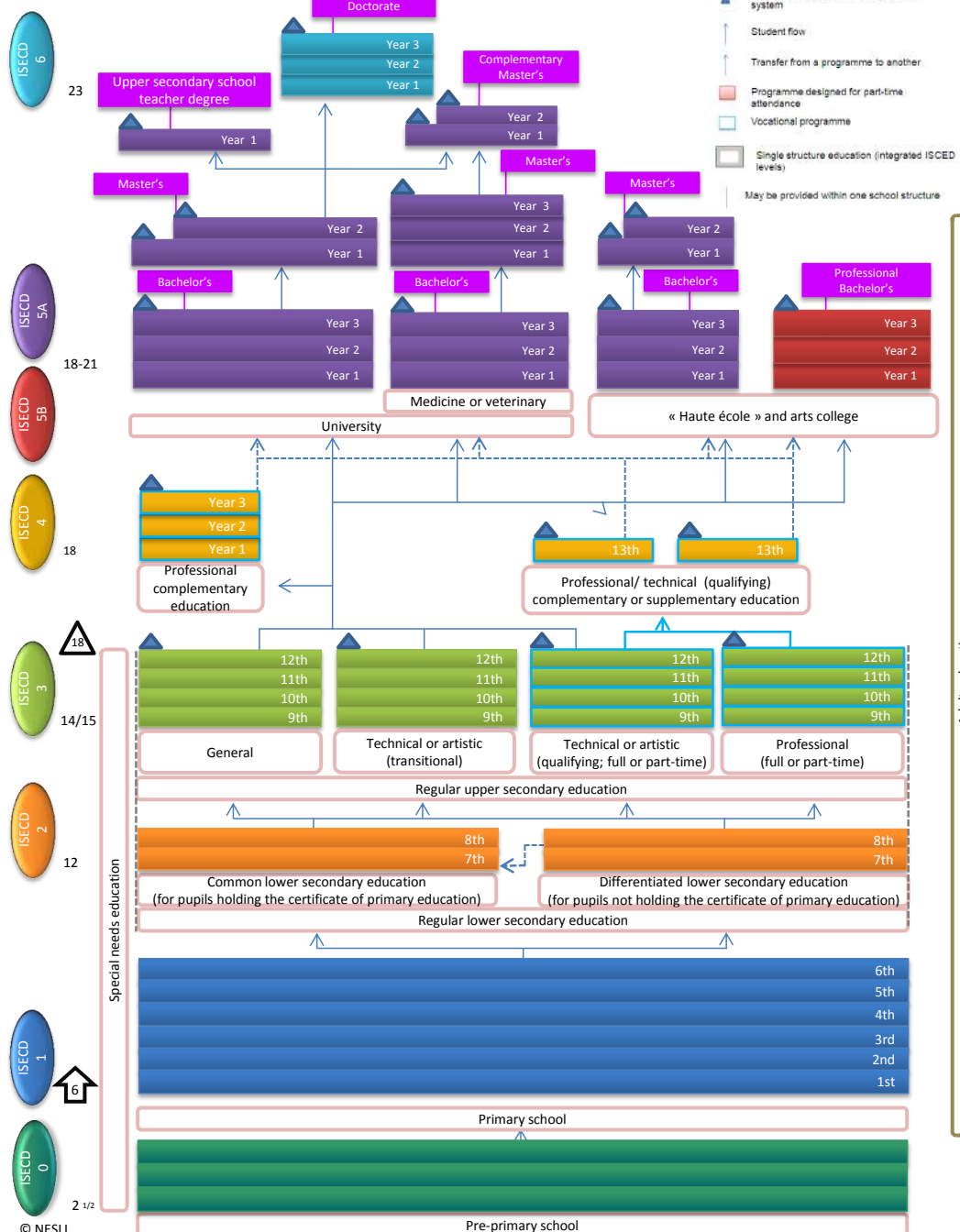
- Per million inhabitants in Belgium (11M) we have:
 - ✓ 10,9 PhD students in ECFA-like physics
 - ✓ 9,3 post-docs in ECFA-like physics
 - ✓ 4,5 professors in ECFA-like physics
 - ✓ 0,1 alive Nobel Prize winners in High-Energy Physics
- In order to follow the European Strategy for Particle Physics, it is important to create and secure funding for Big Science programs in both the Flemish and French region

Extra's

- Diagrams of education system (ref. OECD)

Theoretical starting age

Belgium (French Community)



Theoretical starting age
Belgium (Flemish Community)
 23

