Theoretical Physics in Spain

An overview

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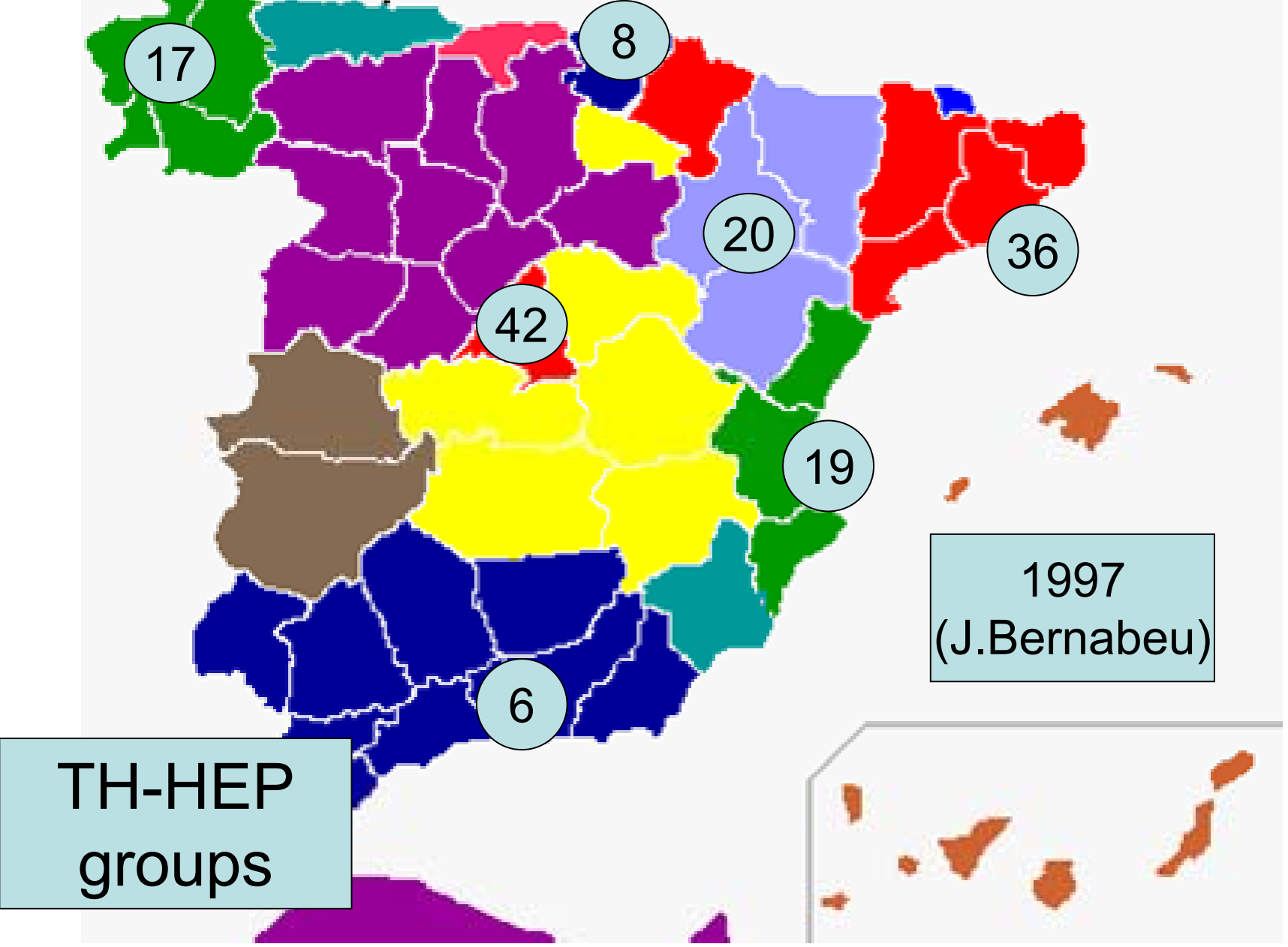
OUTLOOK

1. Personnel & human resources
2. Students & PhD's
3. Funding
4. Topics & interests
5. Productivity & impact


17
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19
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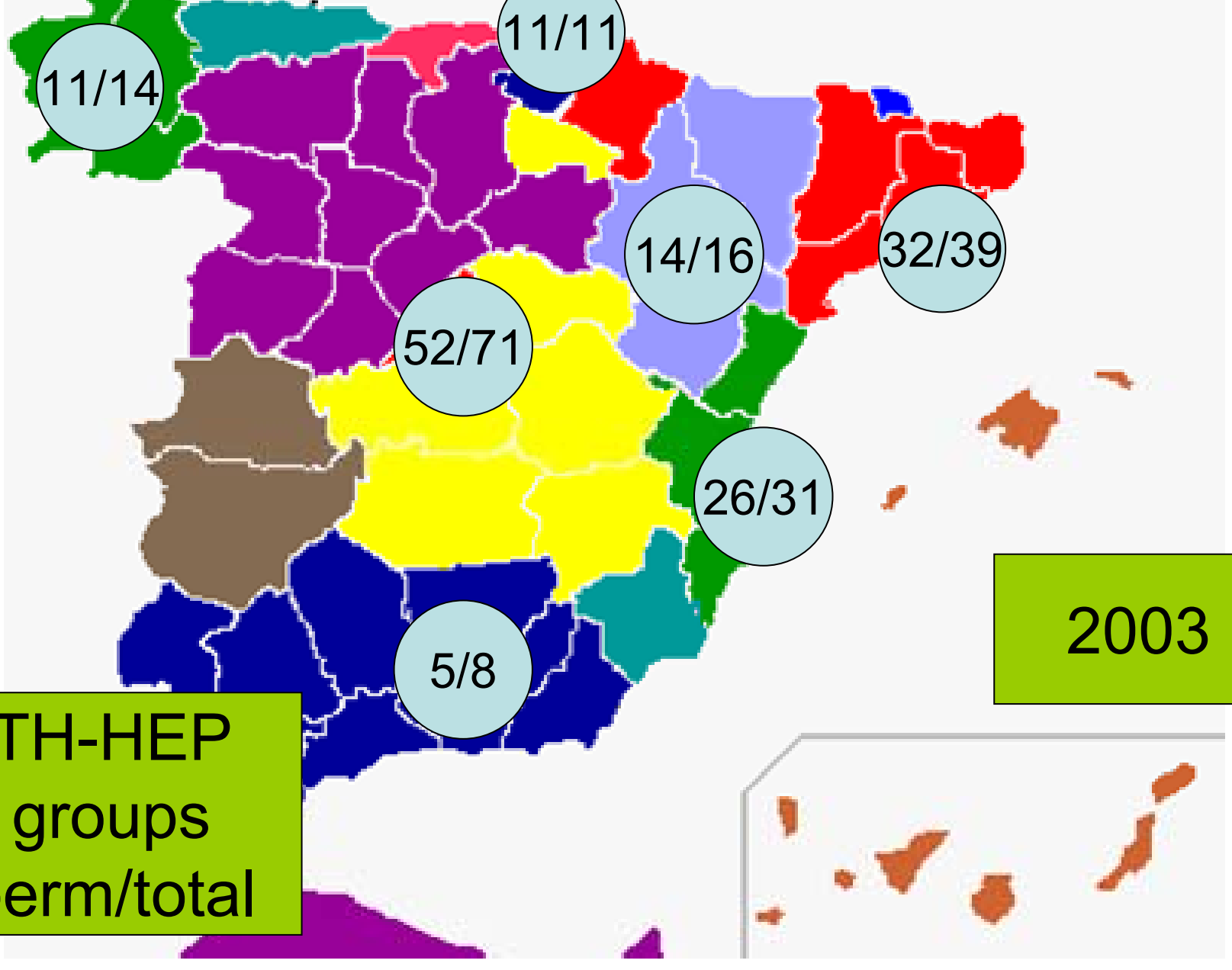
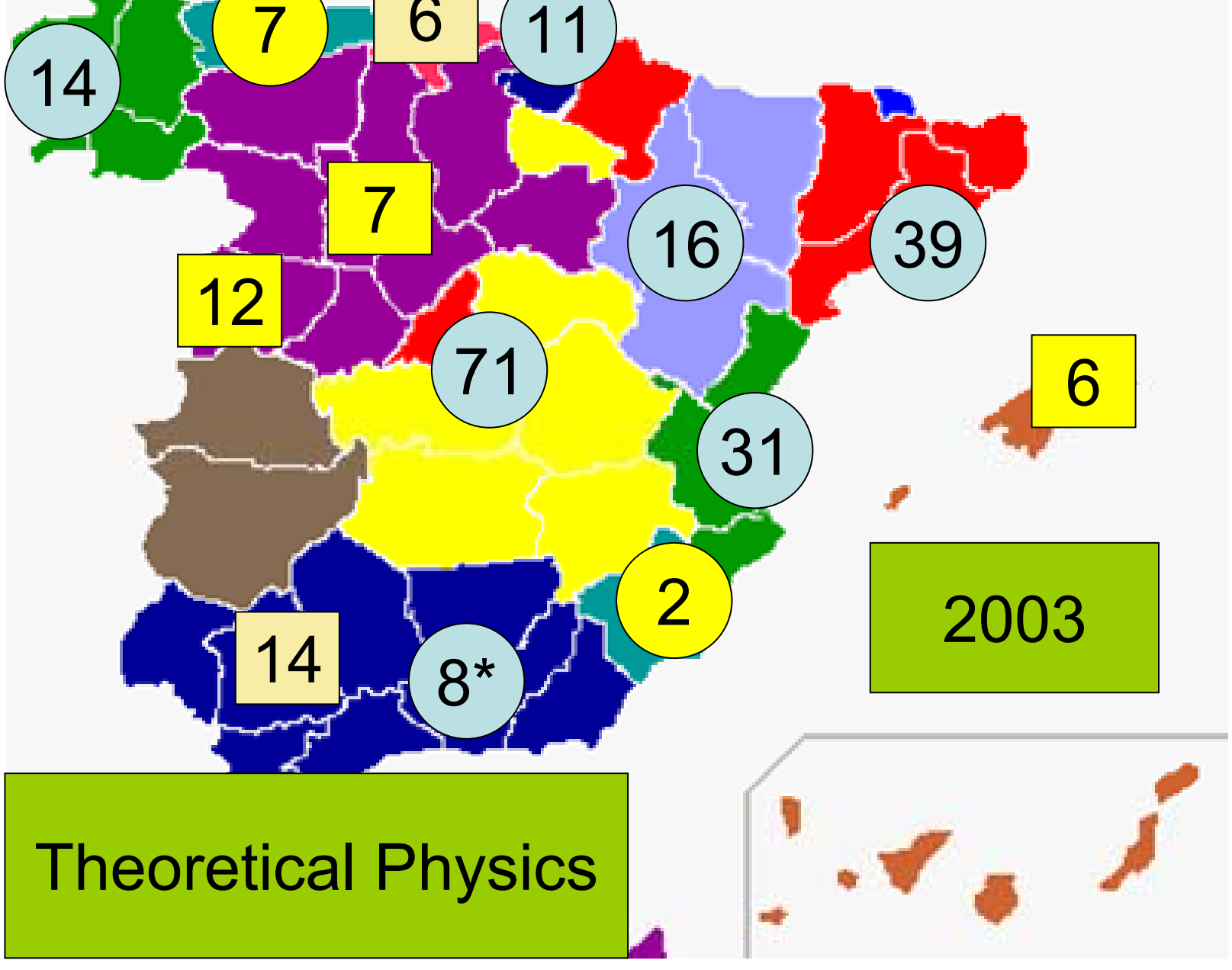
1997
(J.Bernabeu)
TH-HEP
groups



TH-HEP groups perm/total

2003


14
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71
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2003
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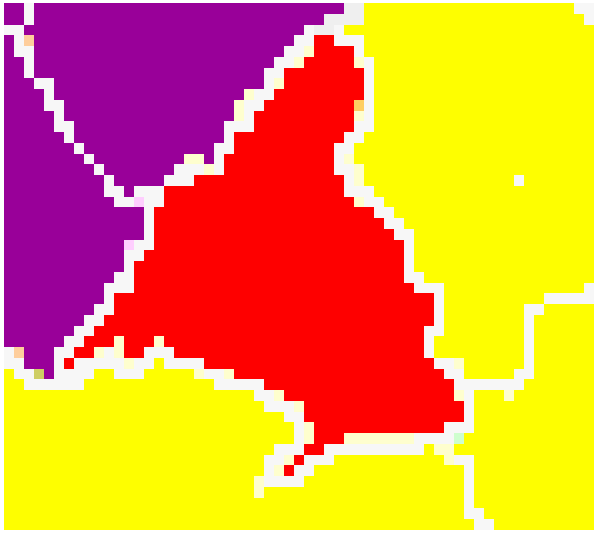
8*
Theoretical Physics

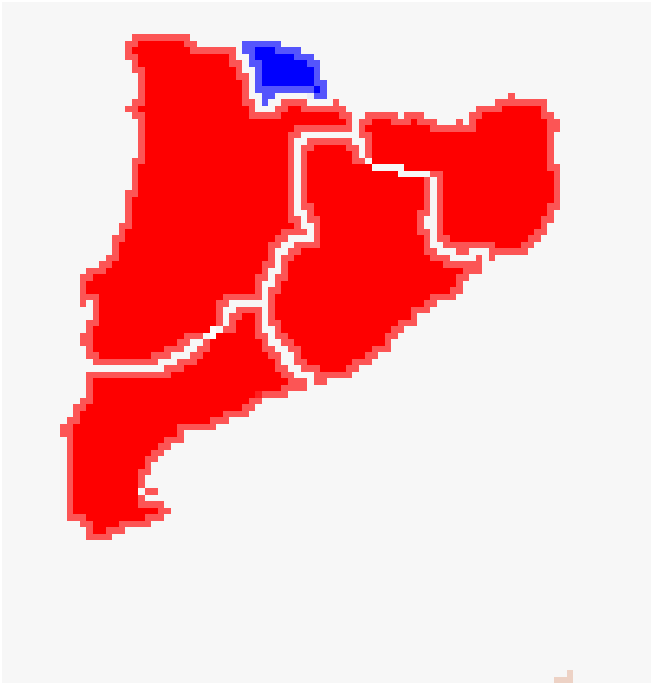


UCM 34

UAM-IFT(CSIC) 26

IMAFF-IEM (CSIC) 11

CAB ?

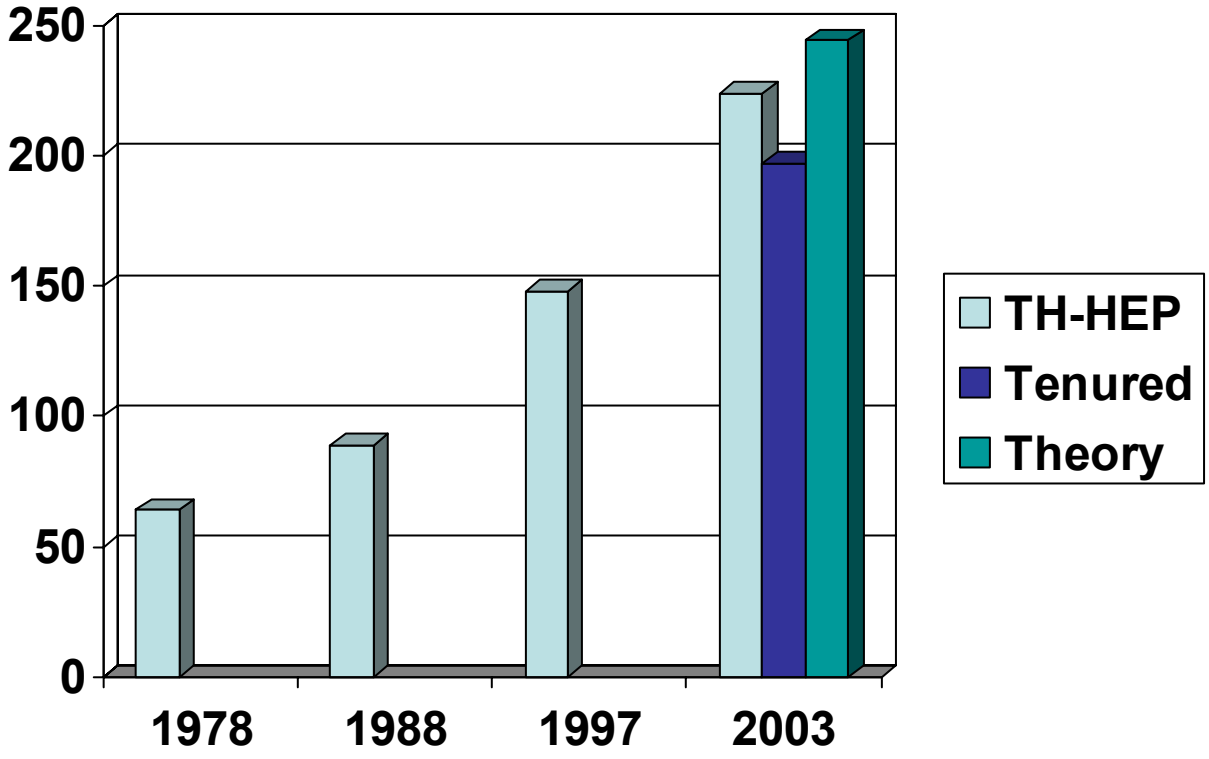


UB 21

UAB 13

UPC 2

IEEC 3


250
200
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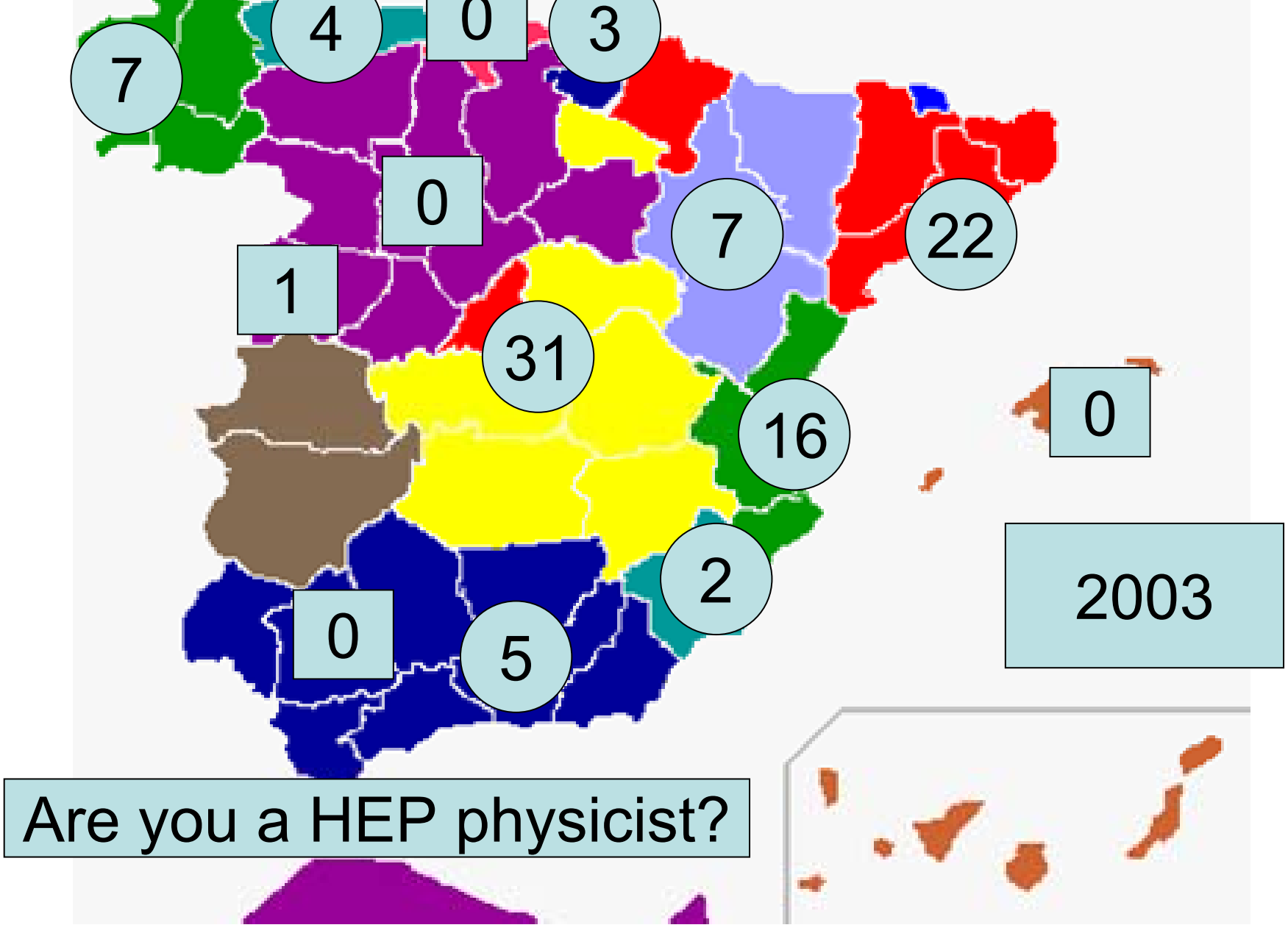
0
1978
1988
1997
2003
TH-HEP
Tenured
Theory


7
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5
2003
Are you a HEP physicist?

Out of 197 permanent staff 98, consider themselves ‘HEP physicists’

197 =168 University lecturers (60+108)
+24 CSIC + 5 Other

Condensed matter: 66+143=209
Applied physics: 167+566=733
Atomic, & nuclear physics: 34+72=106

The relative weight of TH-HEP has decreased

University staff is unlikely to grow

- Decrease in the number of students
- Competition from other subjects
- Tight financial situation of universities

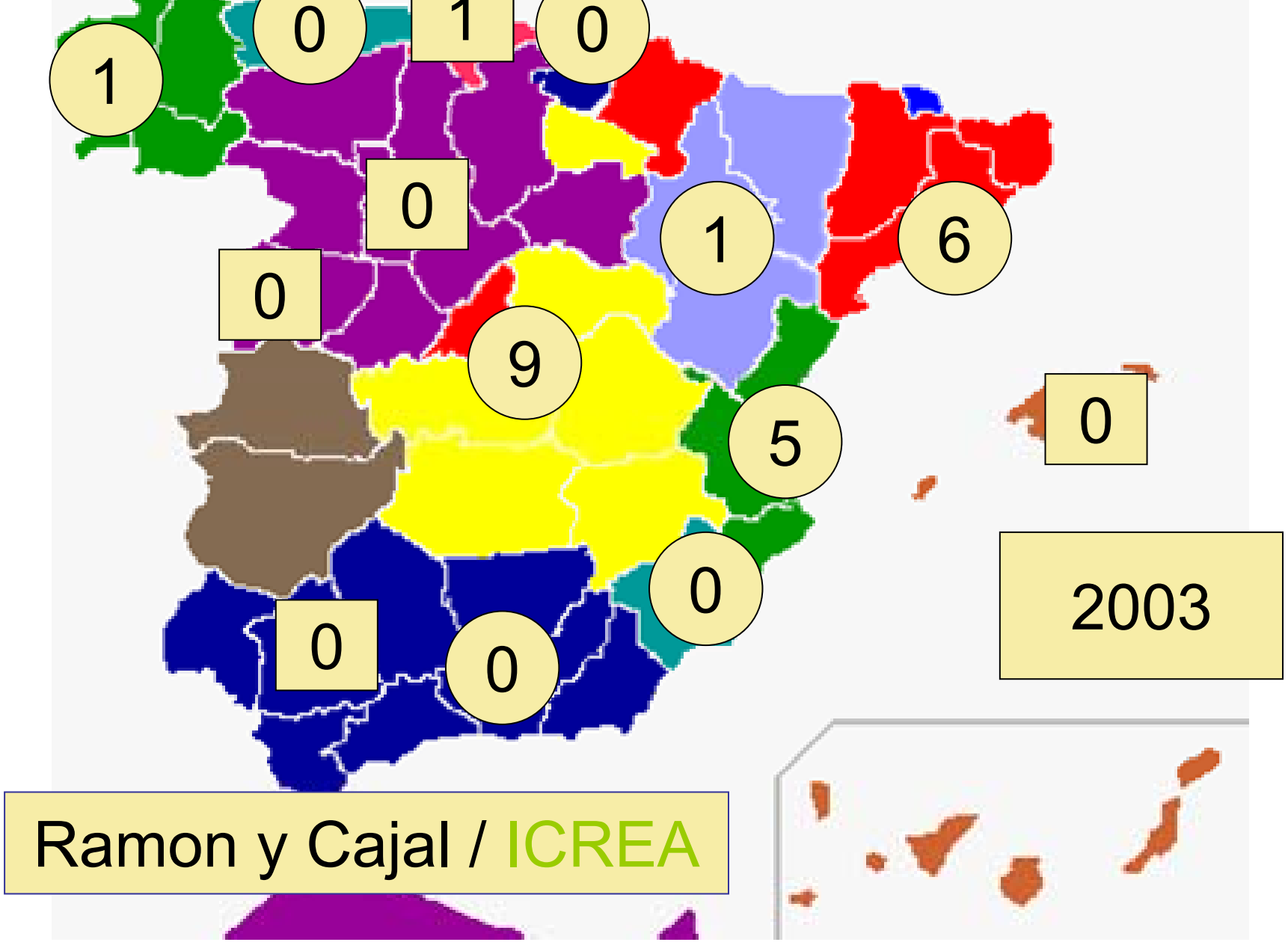
Inverted pyramid?

Temporary(?) bottleneck

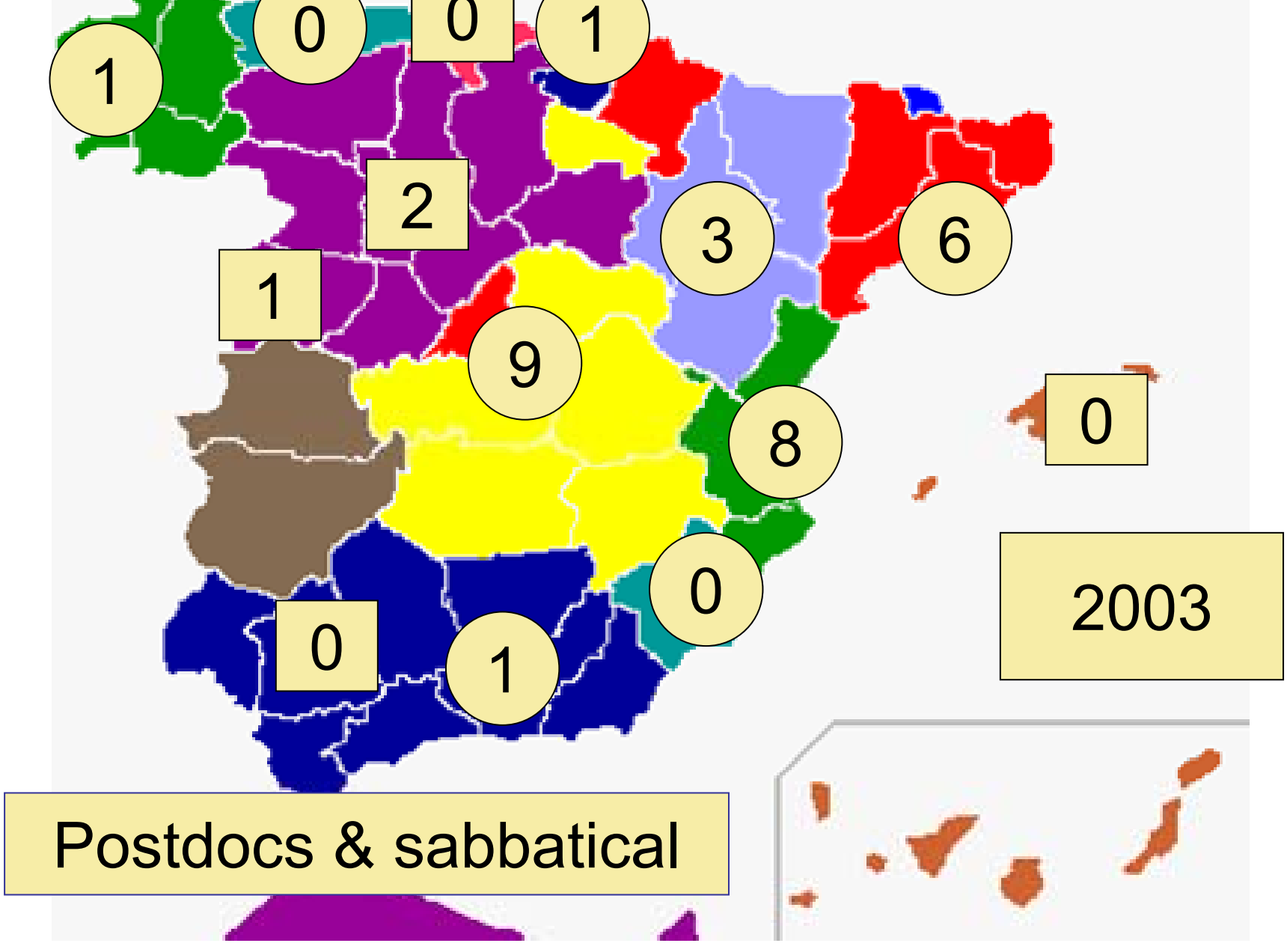
- Misguided reform of university legislation
- Civil servant/contractual issue

Research positions are needed

- HEP-Institute? (1992 minutes!)
- Regional initiatives (ICREA)
- Ramon y Cajal Programme



Ramon y Cajal / ICREA


1
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6
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9
8
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1
2003
Postdocs & sabbatical

Insufficient number of postdocs

`Many more scientists from abroad work now in Spain than there are Spanish scientists abroad' (J.Piqué)

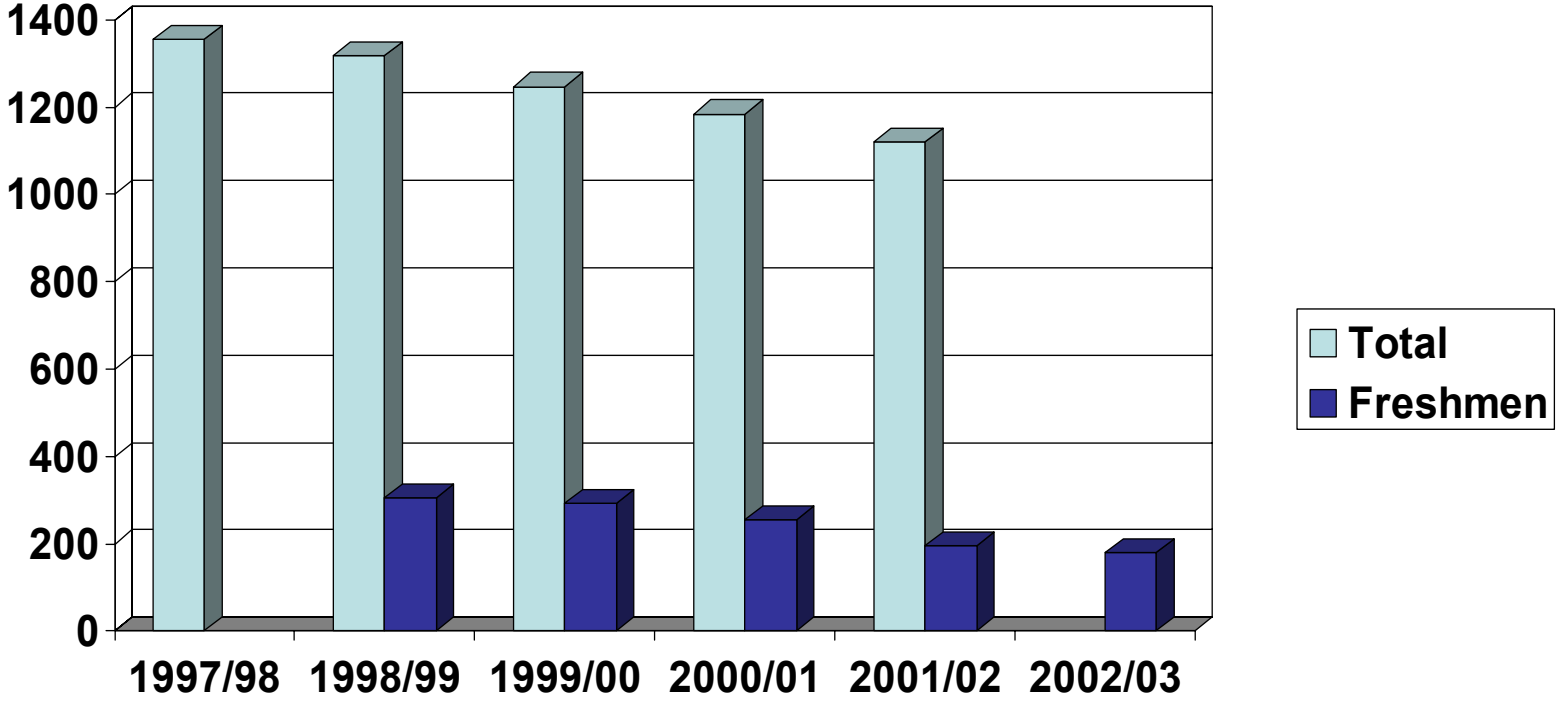
No clear mechanism in universities/CSIC

MECD fellowships pretty much useless

A lot more flexibility and confidence in the groups is badly needed

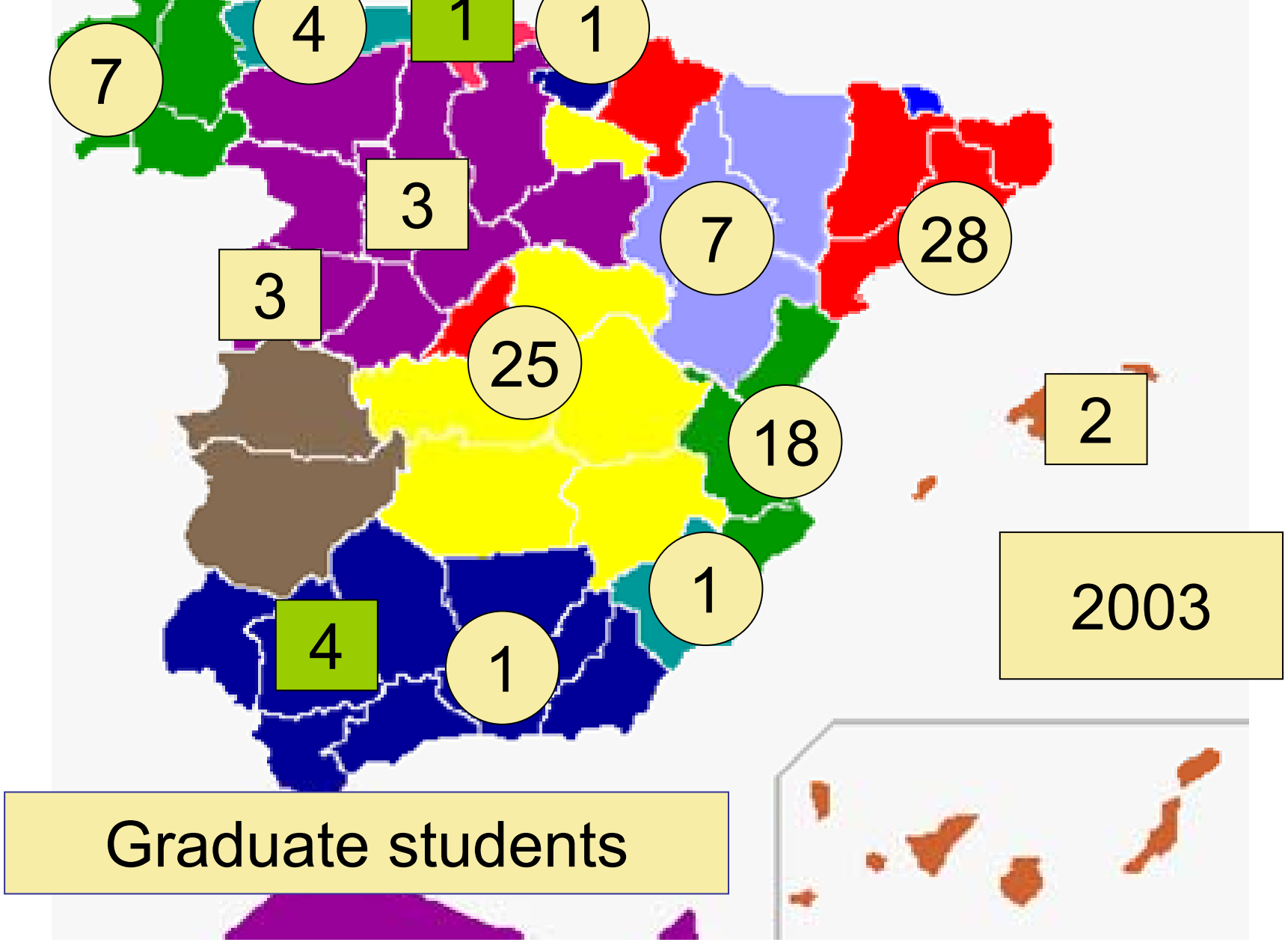
More postdoc fellowships need to be awarded to TH-HEP groups through Plan Nacional

Students & PhDs



Evolution of the number of Physics students at UB in the last 5 years

Smaller universities feel the pinch even more


7
4
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7
28
25
18
2
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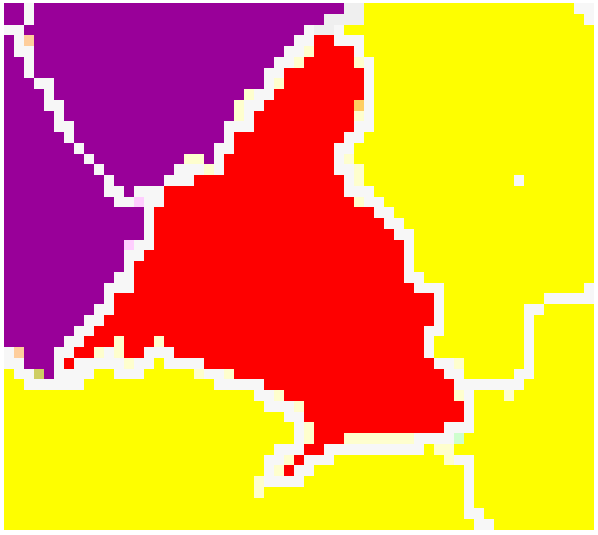
4
1
2003
Graduate students



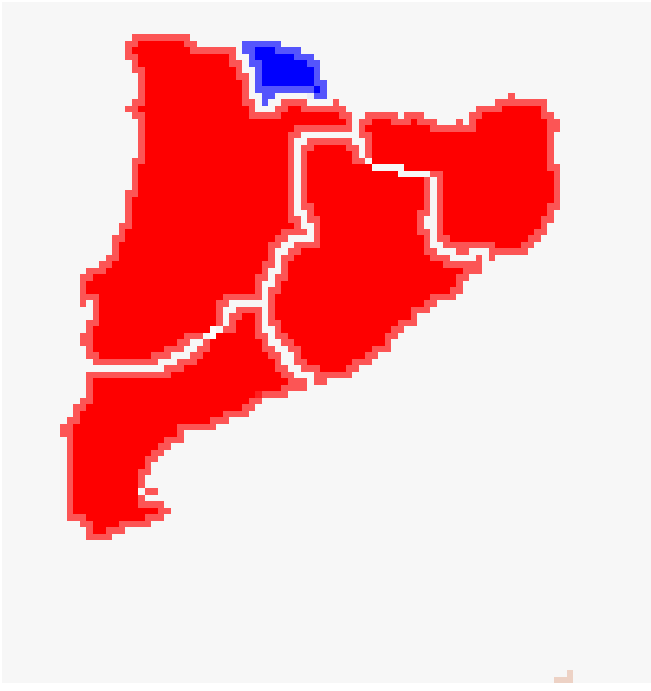
UCM 4 (3)

UAM-IFT(CSIC) 21 (18)

IMAFF-IEM (CSIC) 0?

CAB ?

Number of graduate students (supported)

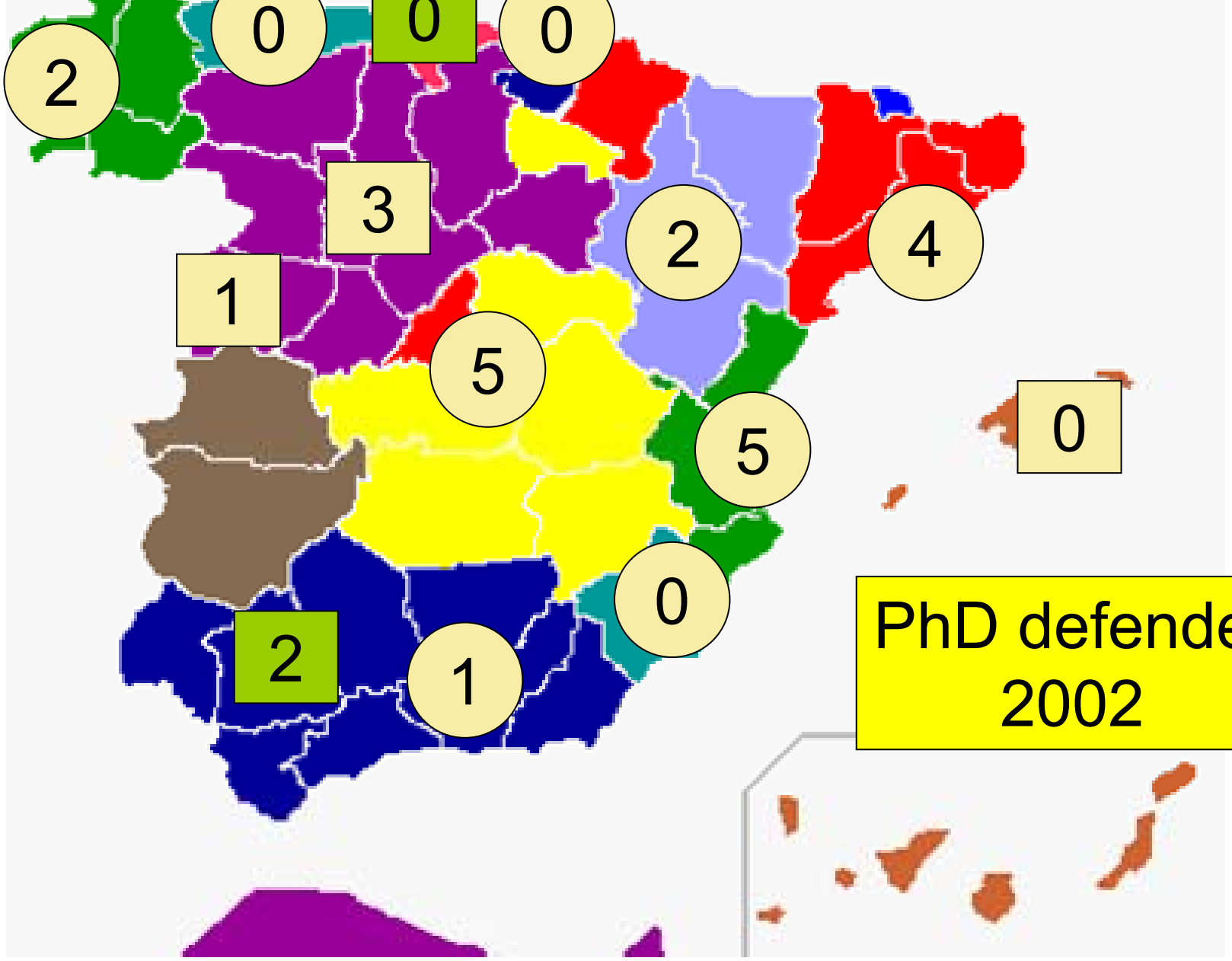


UB 18 (16)

UAB 7 (7)

UPC 0

IEEC 3


2
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0
3
1
5
2
4
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2
1
PhD defended
2002

The system is turning out ~20 new TH PhD's yearly.

In spite of the marked decrease in the number of Physics students (and their academic level!), the number of graduate students interested in HEP has not decreased.

On the whole they are excellent students. A large percentage is supported by graduate fellowships from general programs (highly competitive) of central & autonomous administrations (FPU).

~5 fellowships/year funded through Plan Nacional FPGA (FPI). Only in recent years - previously experimental groups only.

It is easier to get fellowships through Programa de Promoción General del Conocimiento (FPI). ~10 fellowships/year

Dual fellowship system works to our advantage

- But let's keep quiet about that…
- In spite of this…

The number of fellowships should increase

- Good potential candidates have to be turn down

The distribution and timing of FPI fellowships needs racionalization

- Adjustment to academic cycle
- Flexibility

The Ramon y Cajal Programme…

Meant to replace and enlarge existing programs to bring back into the Spanish R+D system scientists abroad

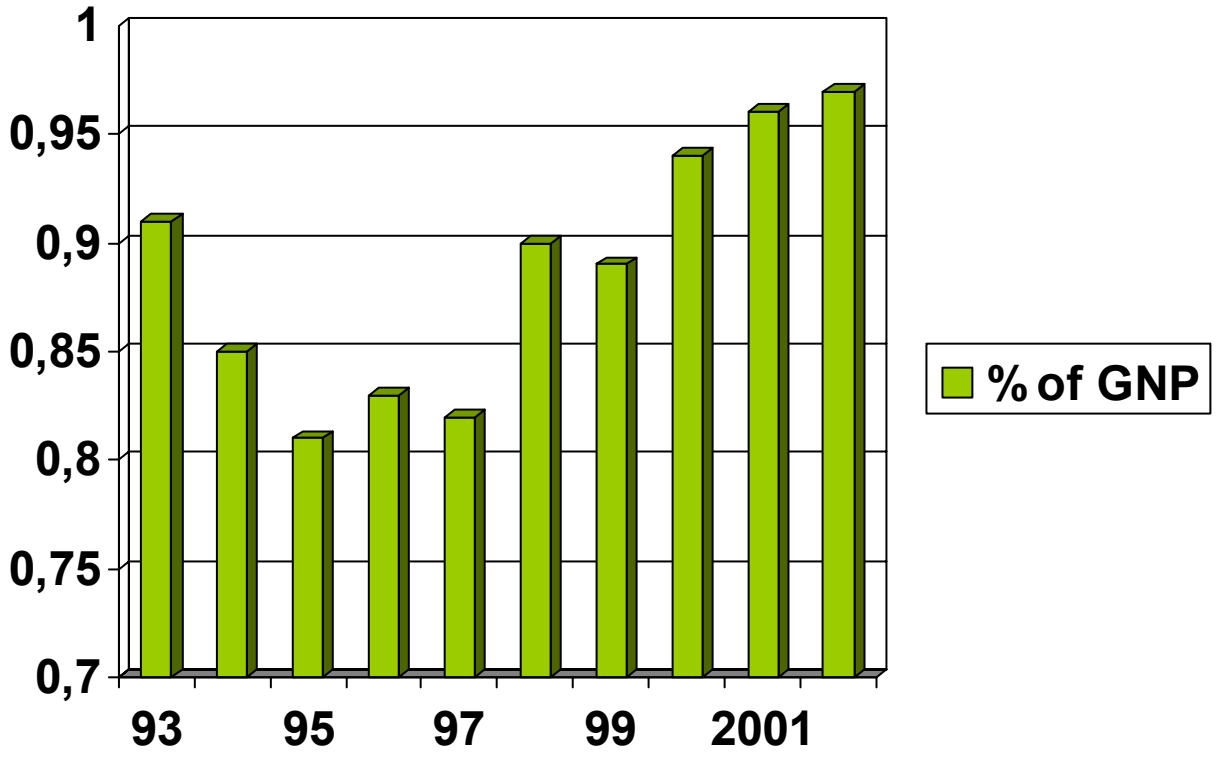
800+500+700 5 year contracts. ~1200 awarded up to now

22 for TH-HEP. 120 to Physics & Space Sciences

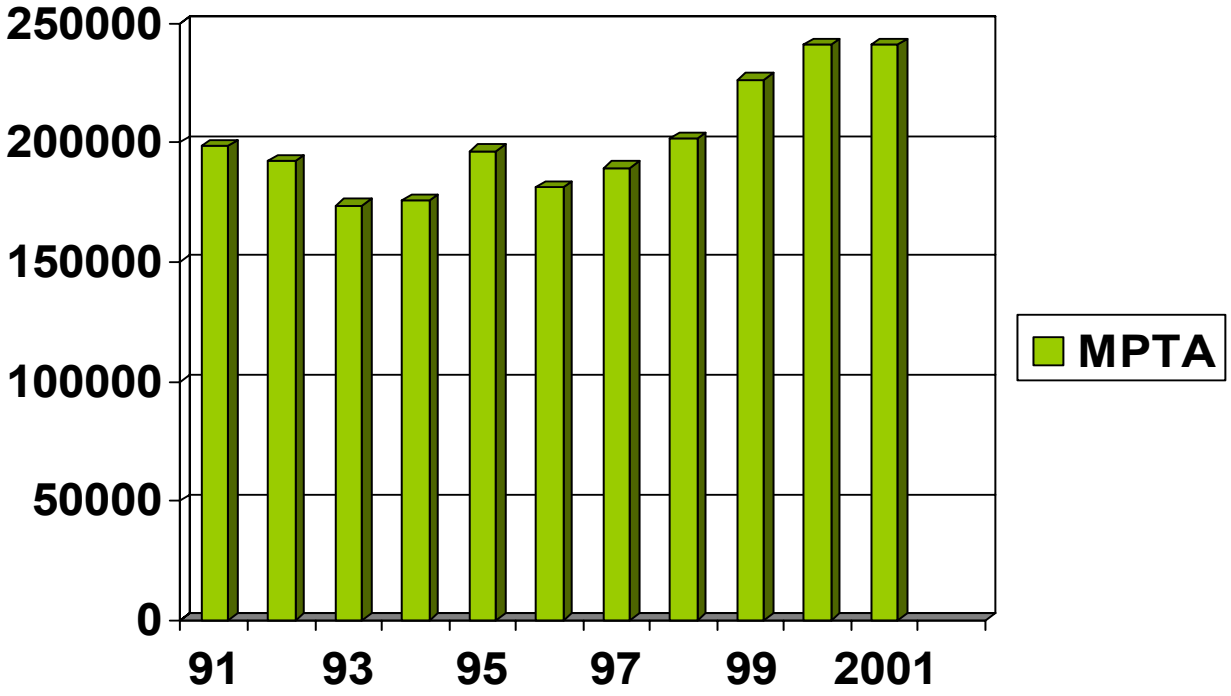
2002 call in Physics & Space Sciences: 41 / 252

Program(s?) needs continuation
Clear ‘target’ needs to be established
Facilitate transition to tenured positions (a%?)
Consistent criteria of selection committee !

Funding

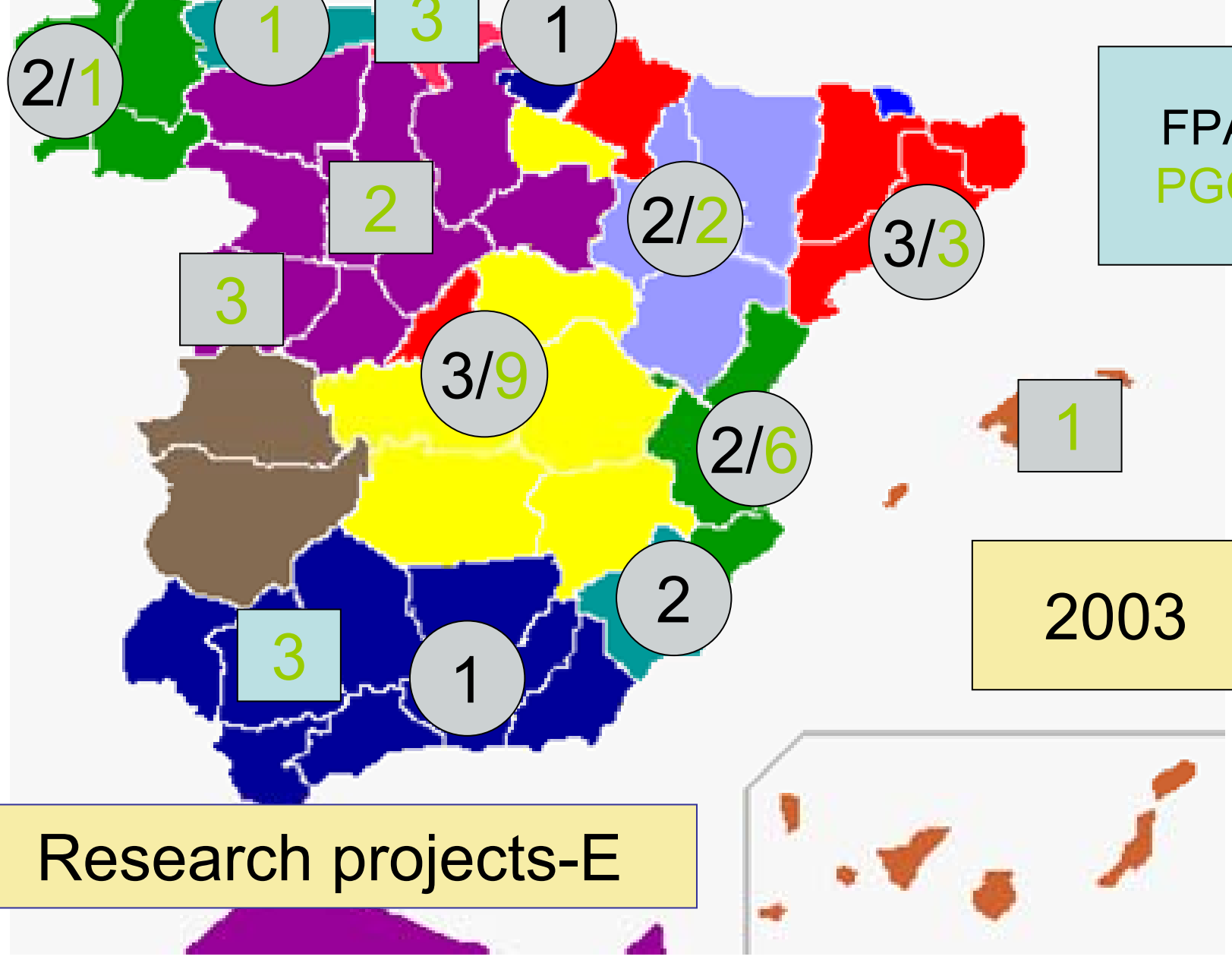


R+D expenditure in Spain



National budget for R+D

1€=166.386PTA


2/1
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3/3
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3/9
2/6
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3
1
FPA
PGC
2003
Research projects-E

Interesting comparisons…

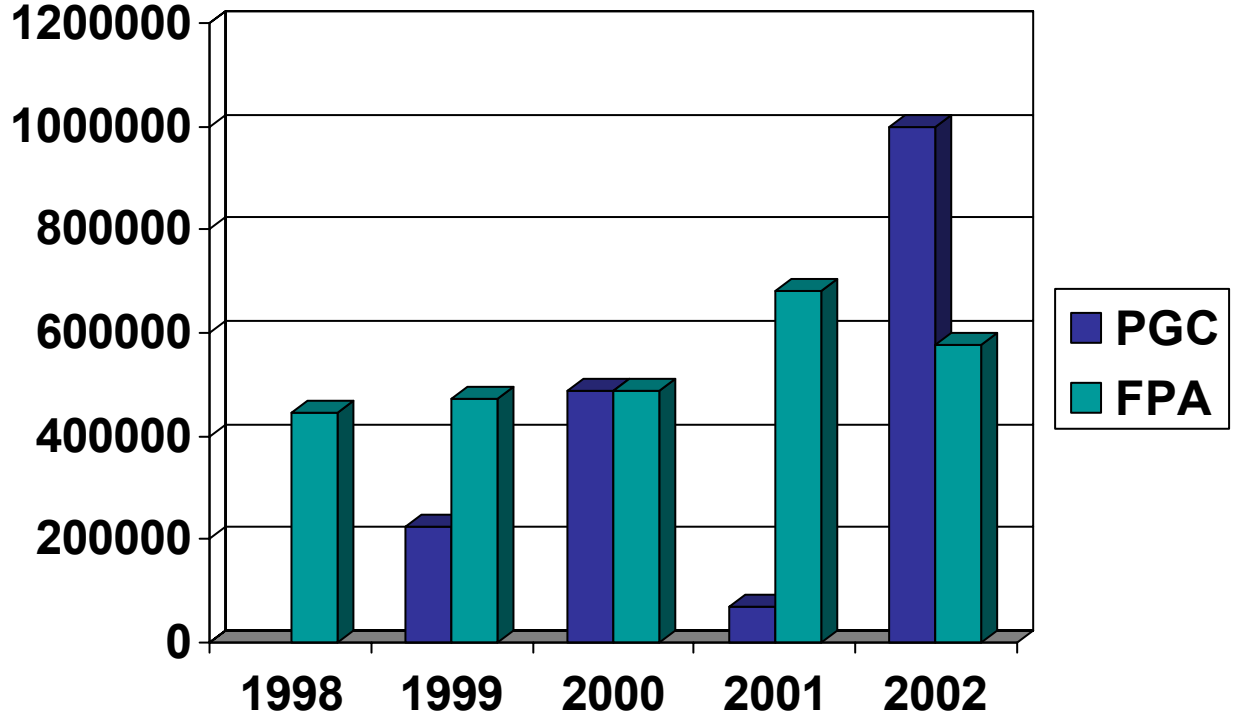
UCM/UAM-IFT 1- 5 / 2 -0

UAB/UB 2 -1 / 1 - 1

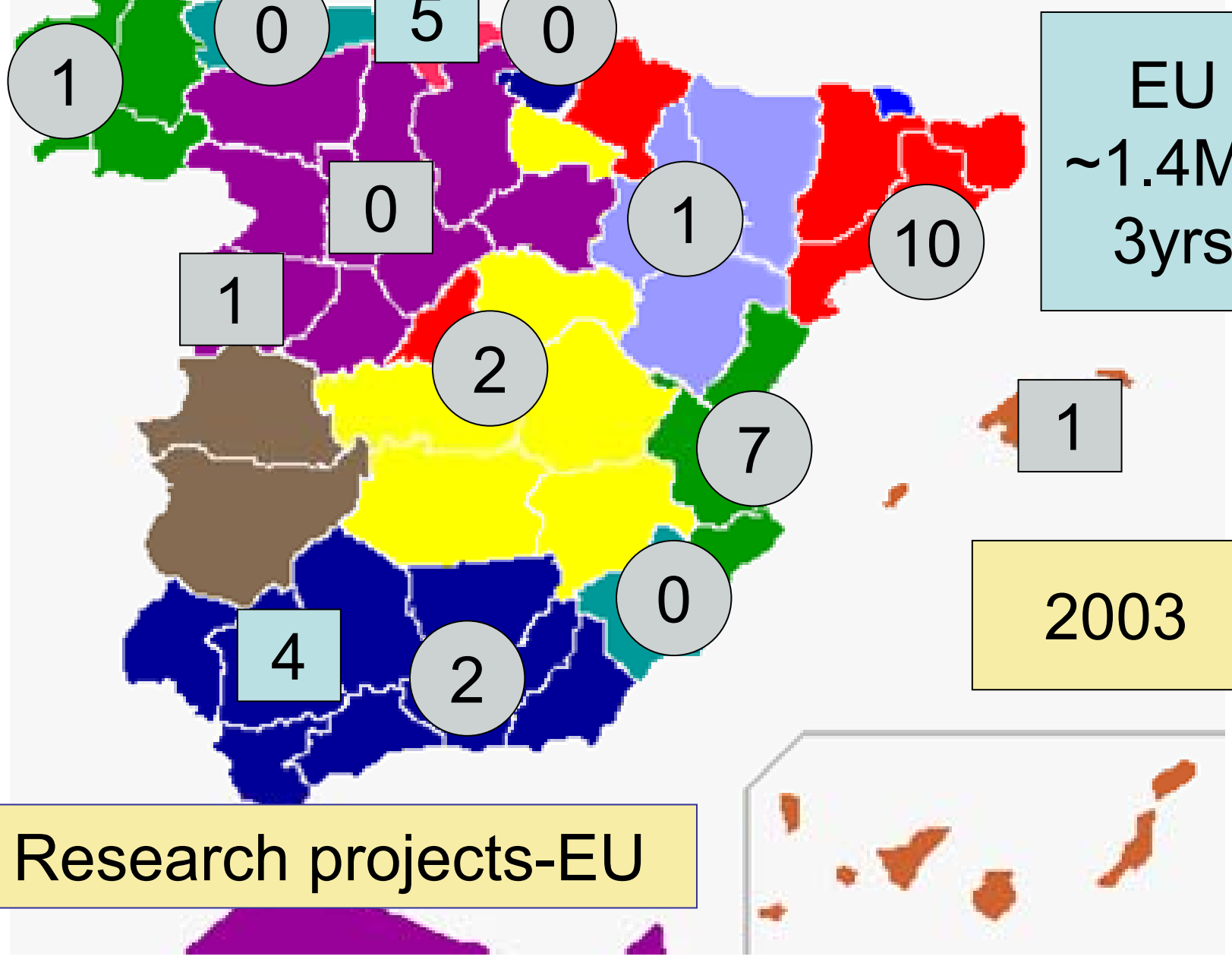
Number of projects very small compared to other fields

PGC: easier to get fellowships. FPA projects penalized

Splitting of projects: discouraged by FPA, but encouraged by some universities promotion policies



Funding of theoretical projects

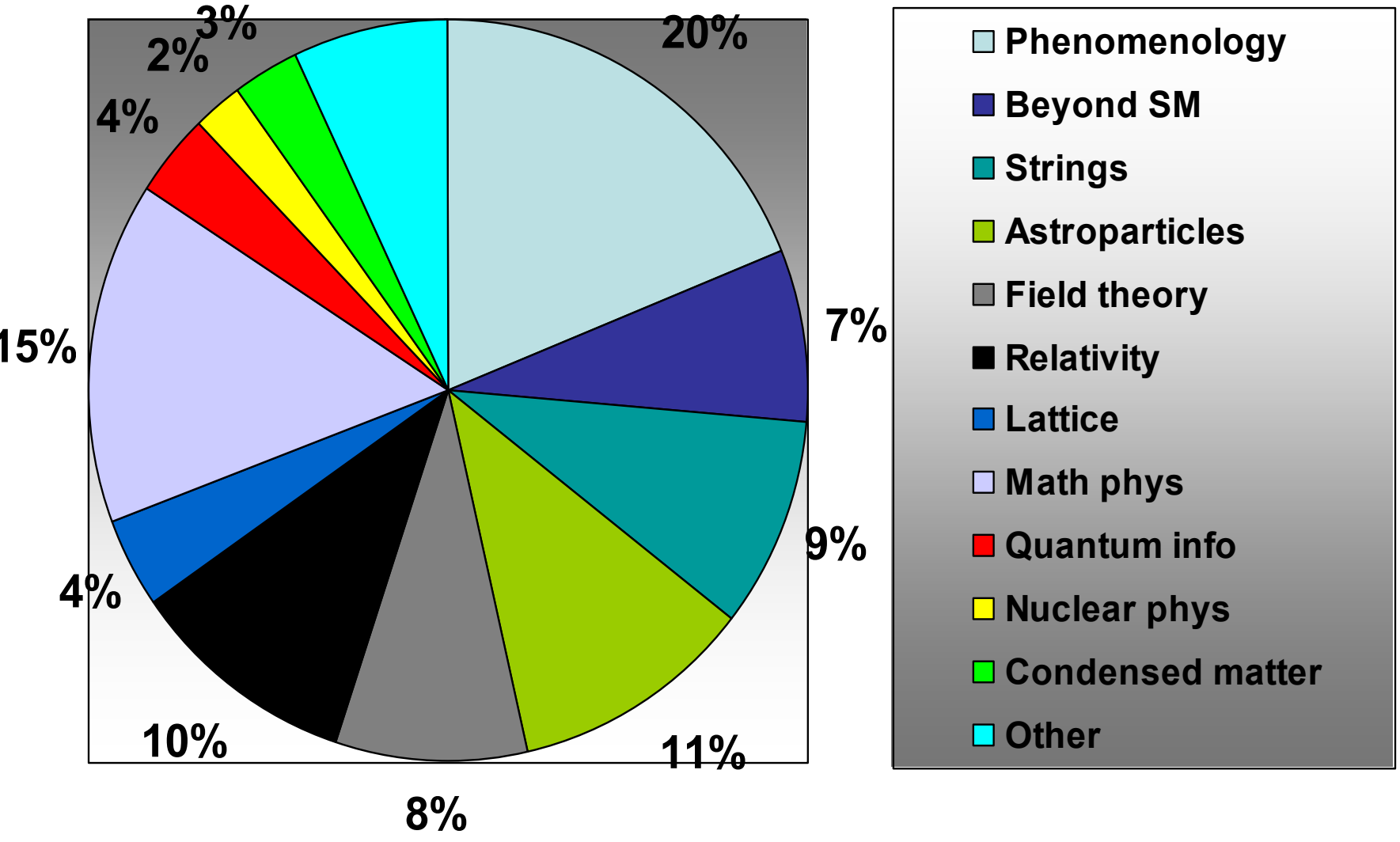


EU
~1.4M€
3yrs

2003

Research projects-EU

Topics & interests



Productivity & impact

Spanish scientific production is roughly 2% of world total

Citation/article in Physics

World: 3.98 Europe: 4.55 Spain:4.33

All-time top cited theory authors (SPIRES database)

>5000 citations: 177

Spanish appear in positions 66, 123, 130**, 166

Last 5 yrs citations

Spanish appear in positions 31,49***,67,69,95,122,151,157,162,163

Tremendous boost in visibility in recent years!

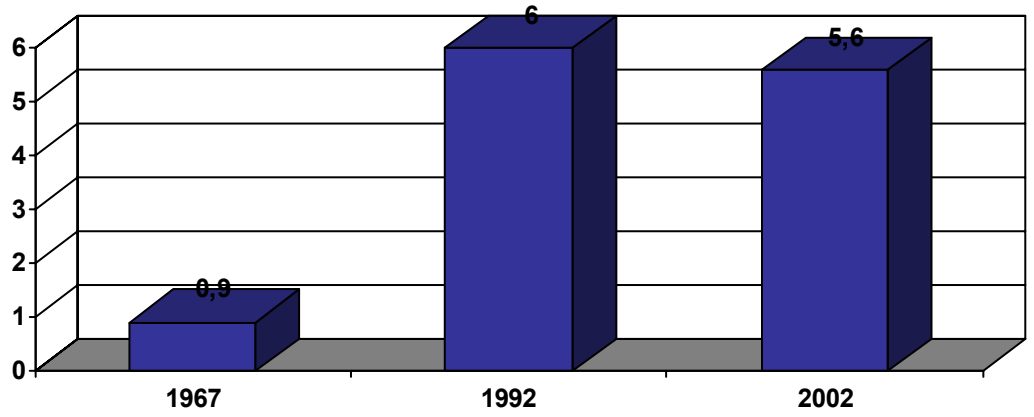
*Carried out in Spanish institutions ** Physicist working abroad *** Foreign physicist working in Spain

Topcited 90 papers by subject in 2001

hep-ph:4 hep-th:4 hep-lat: 5 gr-qc: 0*

Visibility appears mostly associated to certain subfields, some of them not particularly populated in Spain.

Percentage of Spanish papers in NPB



*Database provided only 43 papers. Papers written by Spanish (in Spain or abroad) or foreigners living in Spain

Summary

Theory in Spain is in –in general terms- in good health.

Objective indicators compare quite favourably with other European countries, some of them with a much longer tradition in TH Physics.

Progress in the last 30 years is quite evident.

Some important topics seriously under-represented.

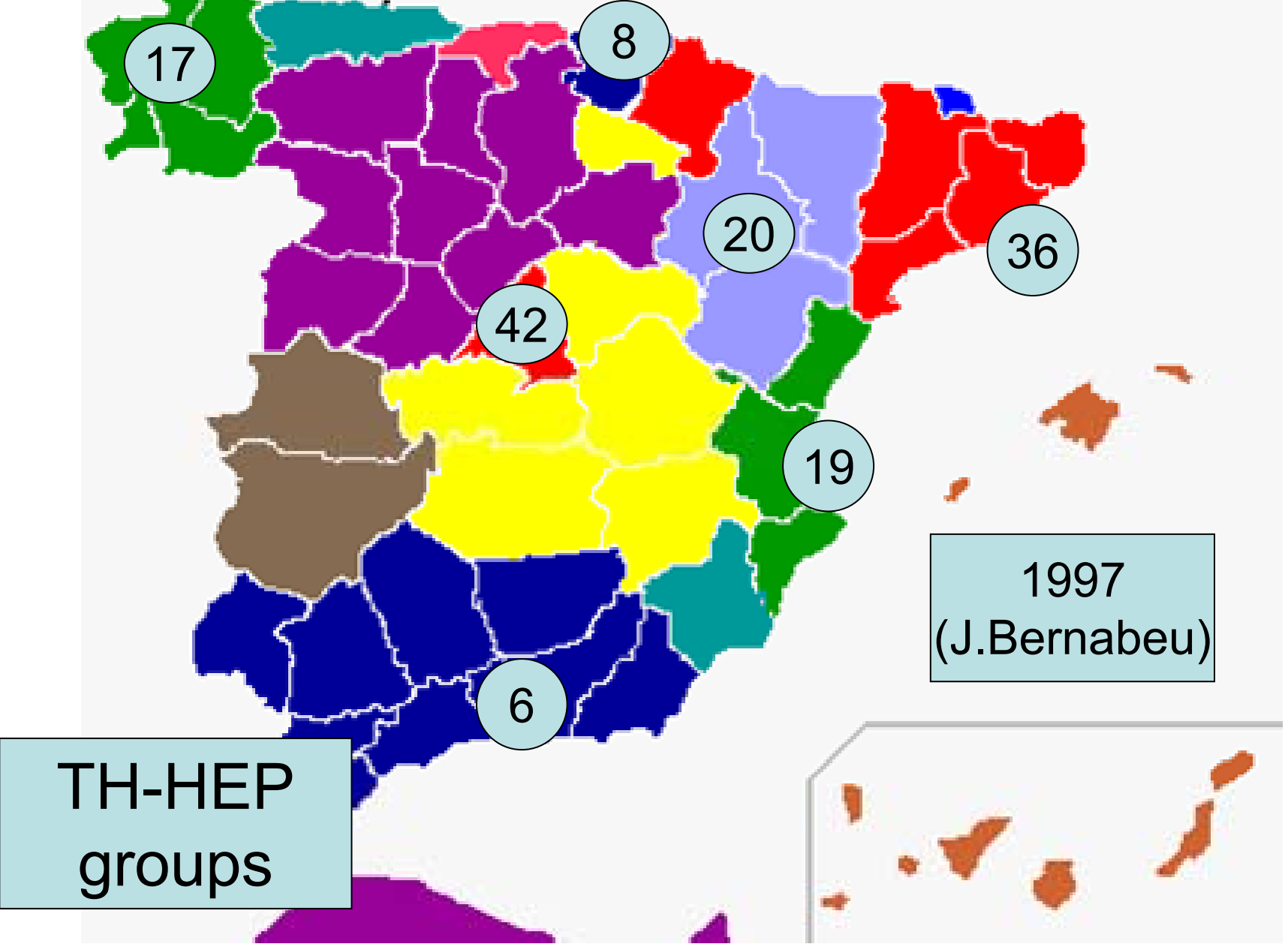
Relative excess of some uninteresting topics.

Lattice and good phenomenology need a boost.

Potential of natural growth seriously impaired.

Bad promotion perspectives for people ~40 y/o.

Room for brilliant new generation is badly needed.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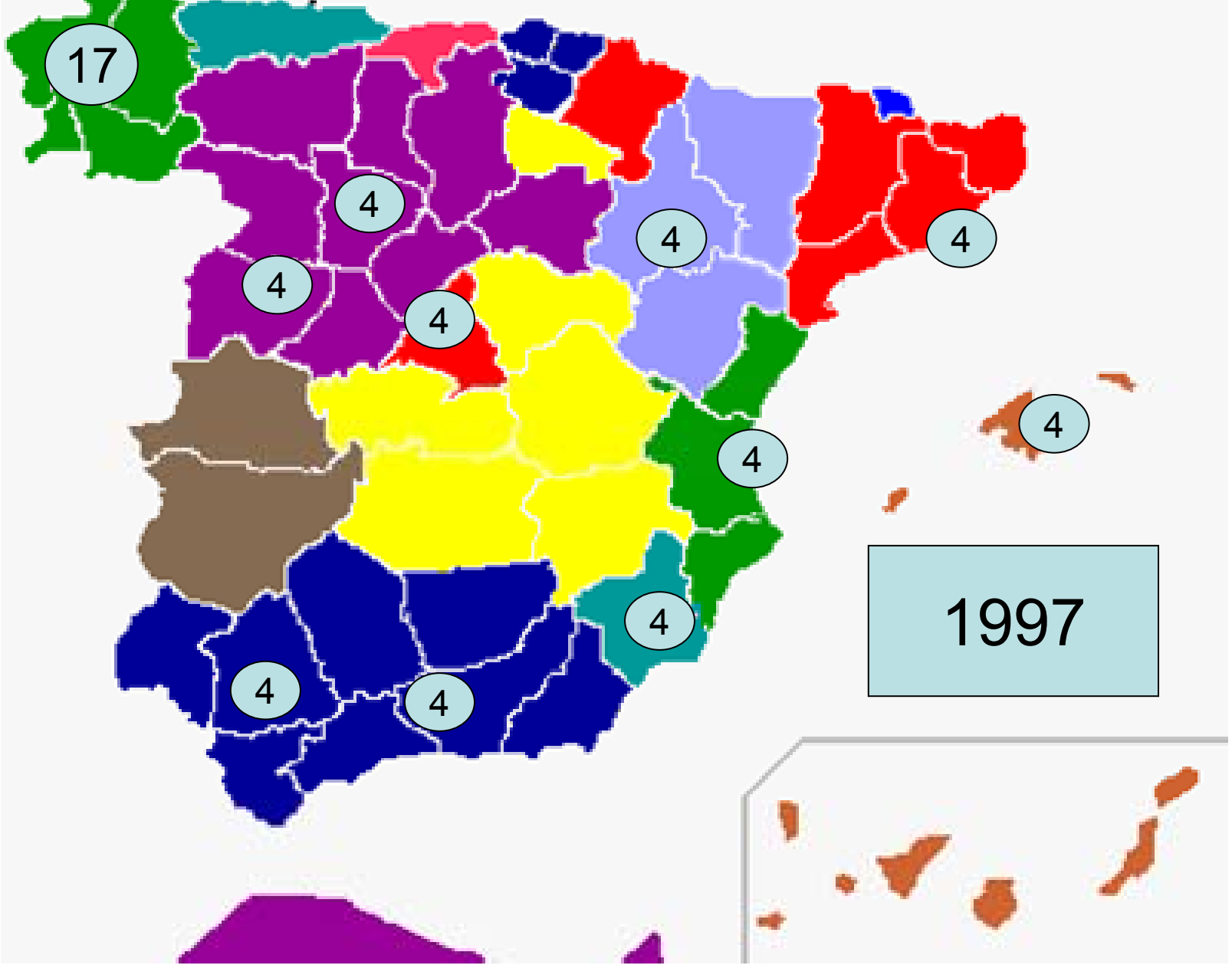
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1997