

# Berrie's Beginnings



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Padova 1995: follow-up of Palaiseau 1992  
Exploring all paths to use Č light for gamma-ray astronomy.



1995: Founded an *Astroparticle Group* at the  
*Centre d'Etudes Nucléaires de Bordeaux-Gradignan* (CENBG).

Senior Scientist Jean Québert obtained

i) a CNRS/IN2P3 position ; ii) a Maître de Conférences ; iii) a thesis fellowship.



First (?) working trip to Thémis  
for the new CENBG Astroparticle Group.



Berrie Giebels

Denis Dumora

Jean Québert



Patrick Fleury

Christian Meynadier

Berrie and I sat face-to-face, 1995 - 1998.

I have very few photos – sorry.

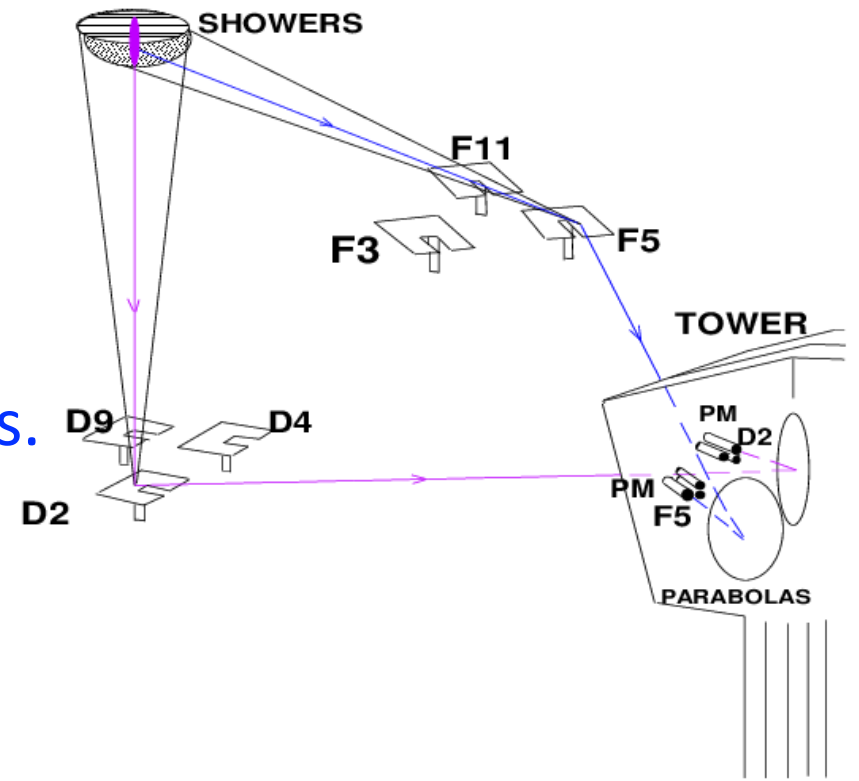
Credit: René Ong, 18 juin 1998.



Before Berrie: ASGAT & Themistocle.

During Berrie: also CAT.

Berrie was « Celeste Phase 0 »:  
2 x 3 heliostats. Makeshift secondary optics.



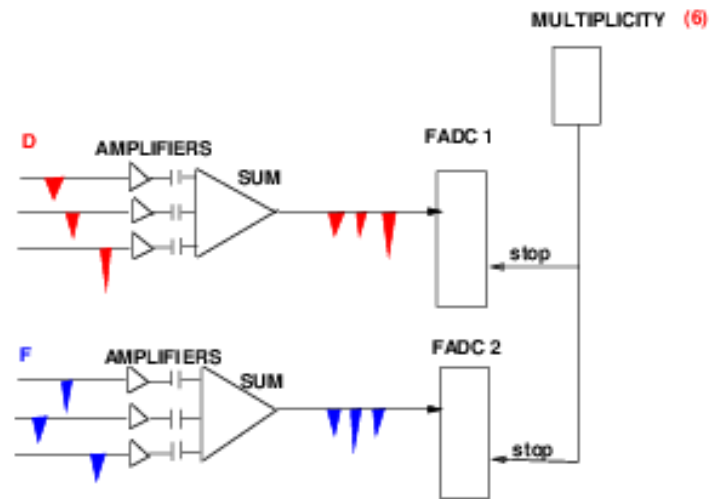
Permission to remove the « furnace » from the tower,  
to install optics, PMTs, and DAQ electronics, was slooowwww....  
Meanwhile: we unwelded heliostats and got them running ; calibrated  
PMT single photoelectron peaks ; etc etc etc etc etc.....

Heat receiver on  
ground at Odeillo,  
near Font Romeu.



Berrie's thesis showed proof-of-principle:

*solar-plant geometry can be re-purposed for atmospheric Cherenkov.*



← Trigger rejects light pollution, accepts Cherenkov flash.

*Thar' she blows!!*

Figure 3. Scheme whereby six photomultiplier signals are digitized using two Flash ADC channels.

Berrie called one of our XP2020 PMT's « *gling gling* ».

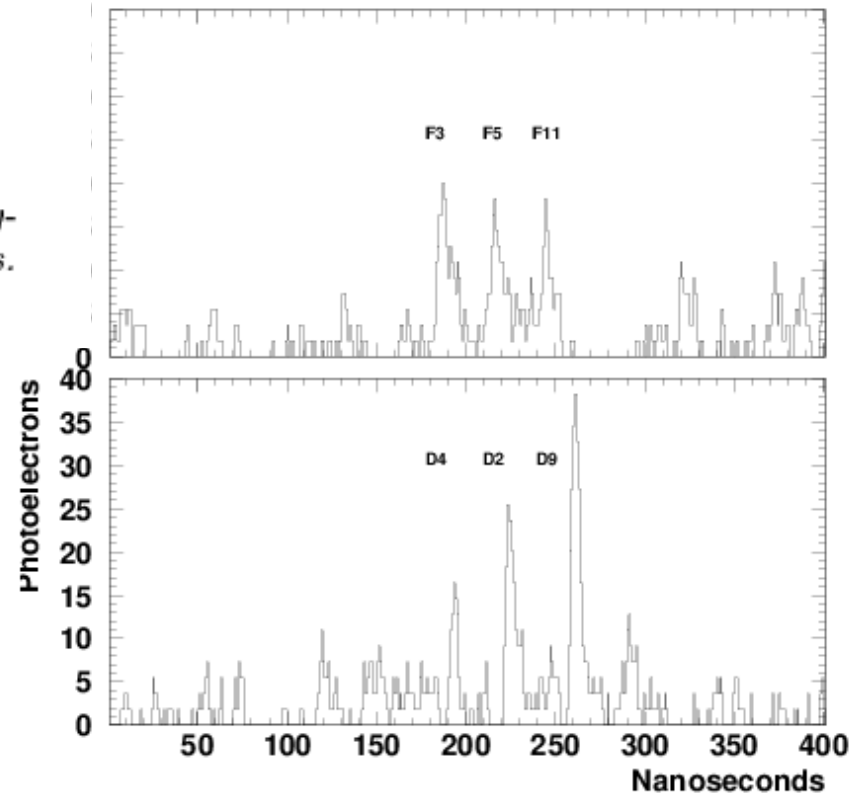


Figure 2. Typical Cherenkov flash as seen by the six phototubes and recorded by two Flash ADC circuits. The labels are the heliostat names shown in figure 1.

## L'UNIVERSITÉ BORDEAUX I

ÉCOLE DOCTORALE DE PHYSIQUE

Par M. Berrie GIEBELS

POUR OBTENIR LE GRADE DE

DOCTEUR

SPÉCIALITÉ : INSTRUMENTATION ET MESURES

Contribution à la reconversion d'une centrale solaire  
en un vaste détecteur pour l'astronomie gamma

Soutenue le : 18 juin 1998

Après avis de : MM. P. Fleury  
R. Ong

Rapporteurs

Devant la commission d'examen formée de

MM. P. Quentin	Professeur, Université Bordeaux I
P. Aguer	Directeur de Recherche, CENBG
J. -L. Masnou	Professeur, Université Bordeaux I
R. A. Ong	Associate Professor, Enrico Fermi Institute, Chicago
E. Paré	Chargé de Recherche, École Polytechnique
J. Québert	Directeur de Recherche, CENBG Bordeaux
Y. Schutz	Directeur de Recherche, GANIL Caen

Président  
Rapporteur  
Examineurs

## The money plot →

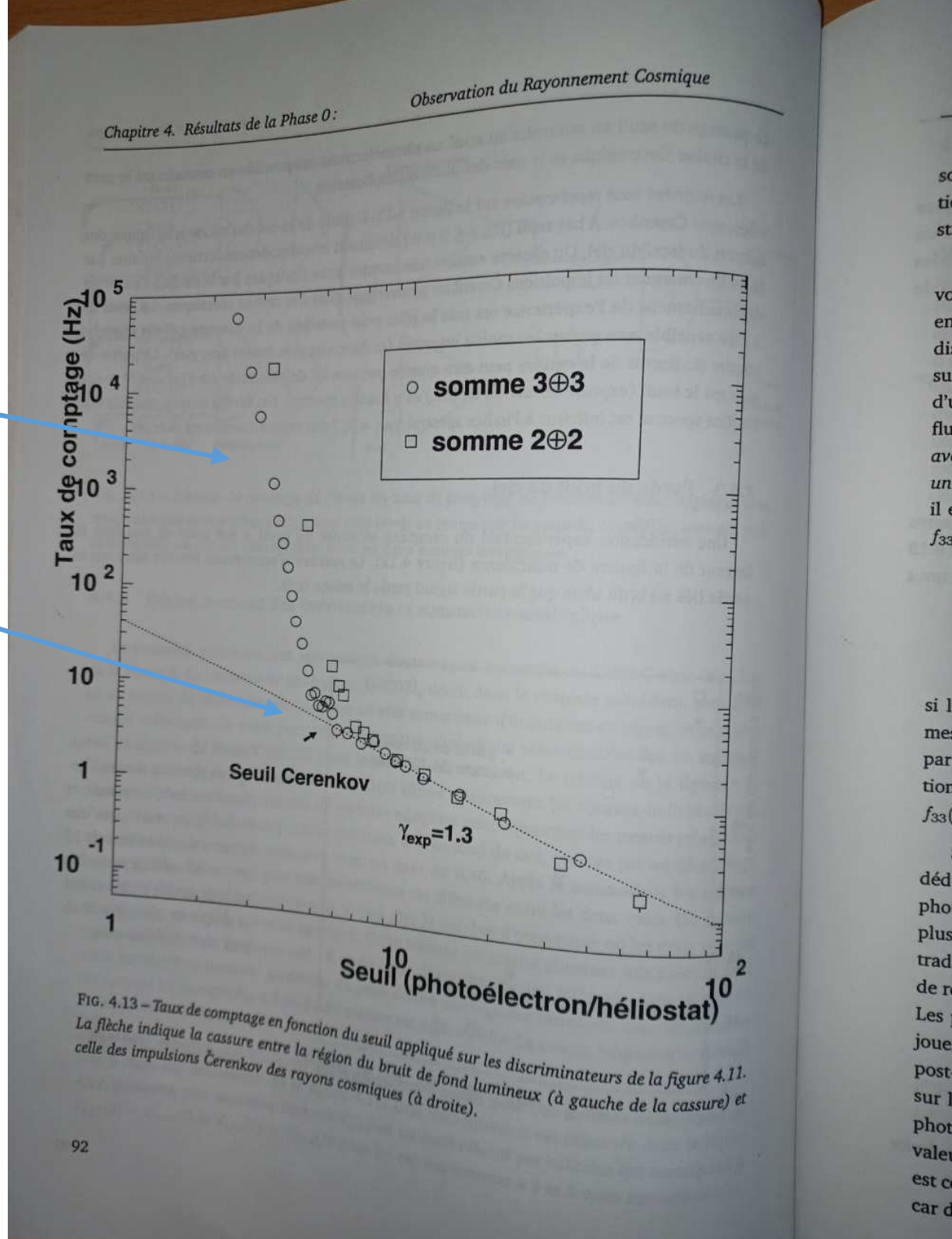
Random coincidences from the night-sky background

Cherenkov flashes

Our focus: *lowest possible  $E_\gamma$* .  
(lowest photoelectron threshold)

Here: mainly cosmic ray protons

Later:  
reject protons, keep gammas.



# Prototype tests for the CELESTE solar array gamma-ray telescope

B. Giebels <sup>a</sup>, R. Bazer-Bachi <sup>b</sup>, H. Bergeret <sup>c</sup>, A. Cordier <sup>c</sup>, G. Debiais <sup>d</sup>, M. DeNaurois <sup>e</sup>, J.P. Dezalay <sup>b</sup>, D. Dumora <sup>a</sup>, P. Eschstruth <sup>c</sup>, P. Espigat <sup>f</sup>, B. Fabre <sup>d</sup>, P. Fleury <sup>e</sup>, C. Ghesquière <sup>f</sup>, N. Herault <sup>c</sup>, I. Malet <sup>b</sup>, B. Merkel <sup>c</sup>, C. Meynadier <sup>d</sup>, M. Palatka <sup>g</sup>, E. Paré <sup>e</sup>, J. Procureur <sup>a</sup>, M. Punch <sup>f</sup>, J. Québert <sup>a</sup>, K. Ragan <sup>a</sup> <sup>1</sup>, L. Rob <sup>h</sup>, P. Schovanek <sup>g</sup>, D.A. Smith <sup>a</sup>, J. Vrana <sup>e</sup> <sup>2</sup>

# Prologue

- ASGAT & Themistocle saw the Crab and more at Thémis.
- Marcel, Eric, and Patrick at Mt Hopkins and the Gran Sasso.
- Tumay Tümer's Solar 1 ideas.
- P & E pushed for CAT, Celeste, and Glast, with Gérard Fontaine.
- Got Berrie's career started (and boosted mine).

1 of 18 Themistocle

Eric & Patrick  
gave Berrie tons of  
good input.



# Those years with Berrie

- Home schooled in the Ariège (Pyrénées) by his off-the-grid Dutch parents. Multilingual
- A U Bordeaux amphitheatre was his first-ever classroom experience!
- He was used to thinking for himself.
- He verified “established wisdom” with gusto. *“Super-luminal” at his defense.*
- He liked to tease, he laughed a lot, he loved a good joke.
- He worked hard & smart.
- We were officially CAT members. Construction. Shifts.
- Ken Ragan at CENBG on sabbatical doing CAT muon rings, in the office next to ours’.  
Enriched our tiny team.

# Le département de l'Ariège (09)

← Bordeaux

His folks lived  
around here  
somewhere.

Thémis.



## Sadness, too.

- His mother died tragically, suddenly, shortly before his thesis defense.
- His father wasn't well afterwards.
- Eric killed in a car crash a month after the defense.

# After Padova 1995: Stacee -- Celeste Summit Meeting at Thémis.

In what Dave Hanna called « *the cloud-shrouded Pyrénées* » (grrrr).

Berrie couldn't be there.



LAT collaboration, Fall 2009  
Stanford KIPAC



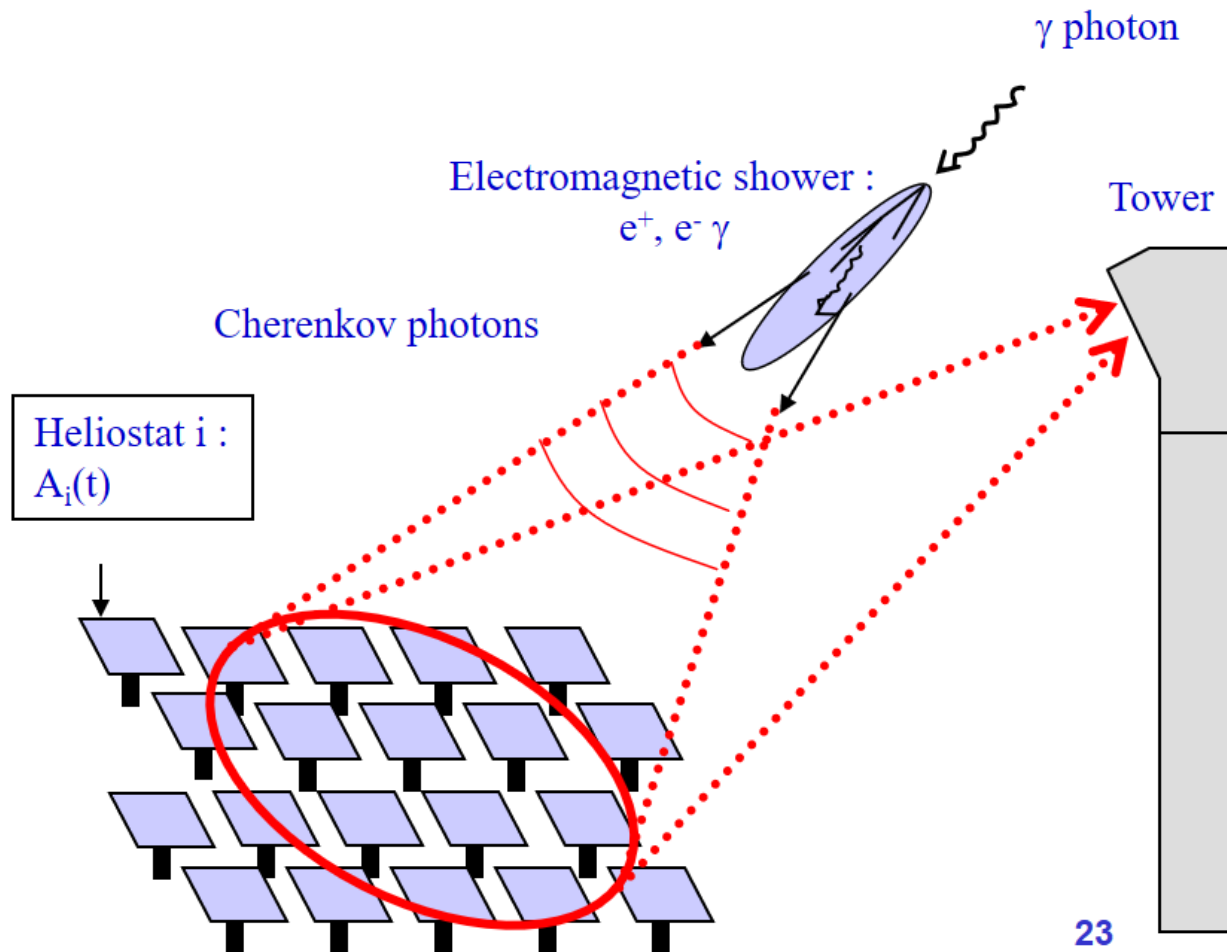
# Epilogue

- After he left the CENBG and Thémis, he didn't come back for many years.
- I'll leave those years to the next speakers.

# CELESTE

1998-2004:

seuls au monde en dessous de 100 GeV.



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# Réseau d'imageurs Tcherenkov HESS

*2004: une percée majeure.*

Bientôt suivi par le CTA (Cherenkov Telescope Array).

En Namibie. Franco-allemand.

4 x 12 + 1 x 28 mètres.

