Compléments prospectives

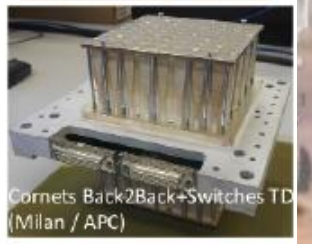
S. Loucatos

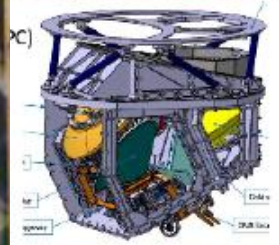
DPhP-Irfu et APC

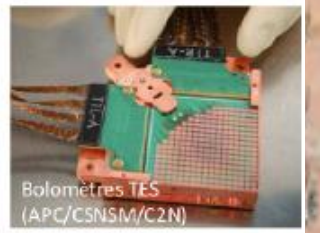
QUBIC

- Recherche des modes-B primordiaux
  - Smoking-gun pour l'inflation
- Nouveau concept instrumental:
  - Interférométrie bolométrique
- Seul large projet Européen au sol
  - Leadership APC
  - France-Italie-Argentine-UK-Irlande
  - Stepping-stone pour S4/E4
- Site: San Antonio de los Cobres, Arg.
  - 5000m a.s.l.
  - Logistique + montures : Argentine
  - NEW: route d'accès construite

Objectif: σ(r)=0.01
2 ans de données
(2018-2020)

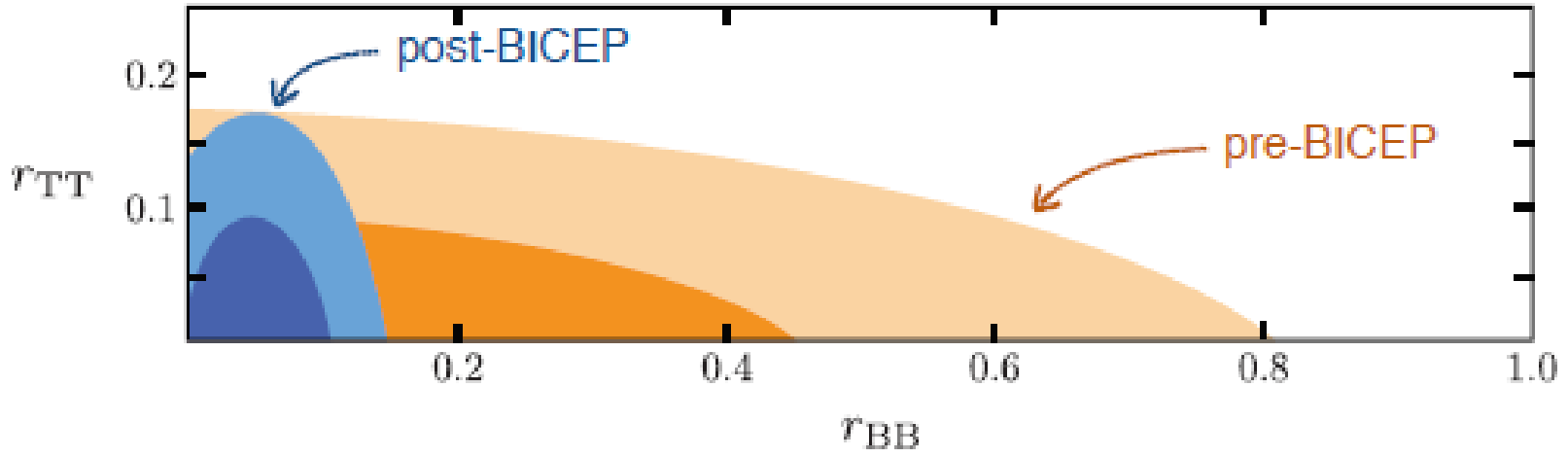






Future Optimism

There has been great experimental progress in recent years:



But, the era of B-mode cosmology is only beginning:

ground		balloon	future
BICEP2	PolarBear	EBEX	LiteBird
Keck Array	Simons Array	Spider	CMB Stage IV
BICEP3	C-BASS	Piper	COrE
SPTpol	QUIJOTE		
ACTpol	B-Machine		
ABS	CLASS		

Qubic

Physique de l'inflation

Daniel Baumann

https://indico.in2p3.fr/event/14661/

Future Optimism

What should we do ***after*** a B-mode detection?

- Check for consistency:
  - Gaussian
  - scale-invariant
  - superhorizon
  - parity-invariant

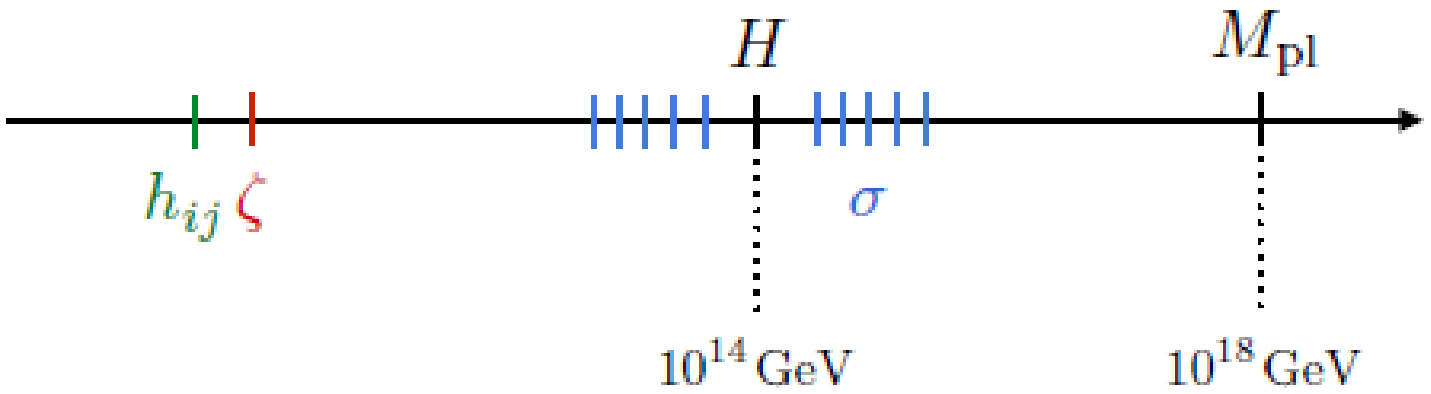
- Look for additional signatures of high-scale physics:

Non-Gaussianity

Non-minimal Tensors

Non-Gaussianity

If inflation occurred at a high scale (maybe as high as **10^{14} GeV**), we have the opportunity to probe the particle spectrum at those energies:



These fields could tell us something about the **microphysics of inflation.**

Chen and Wang [2009]
DB and Green [2011]
Arkani-Hamed and Maldacena [2015]

Physique fondamentale avec les OG

2 exposés de Chiara Caprini, Lisa France
https://indico.in2p3.fr/event/16360/

LISA AND COSMOLOGY:

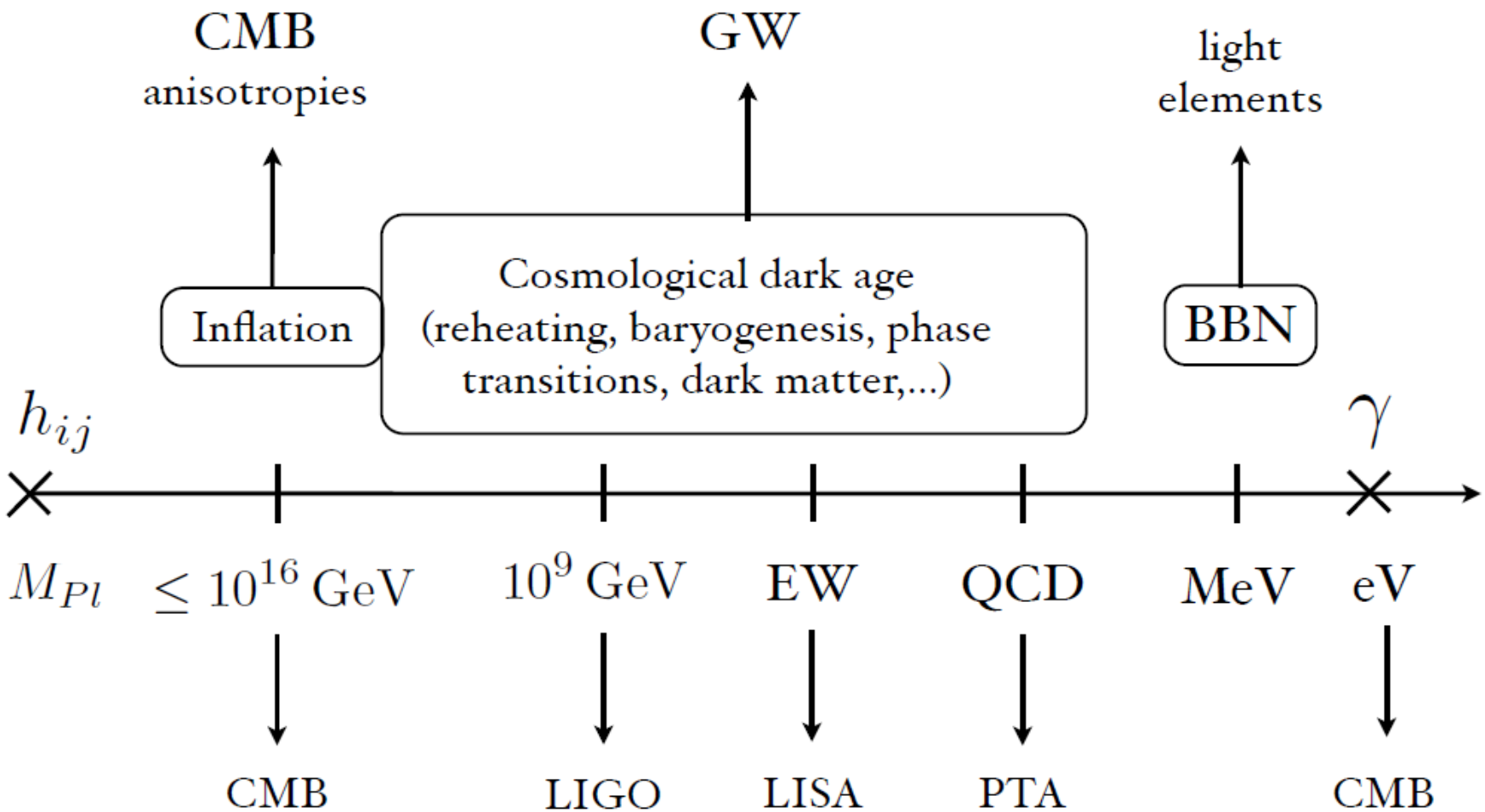
the stochastic GW background from primordial sources: test of early universe and high energy phenomena

use of GW emission from binaries to probe the background expansion of the universe : test of acceleration

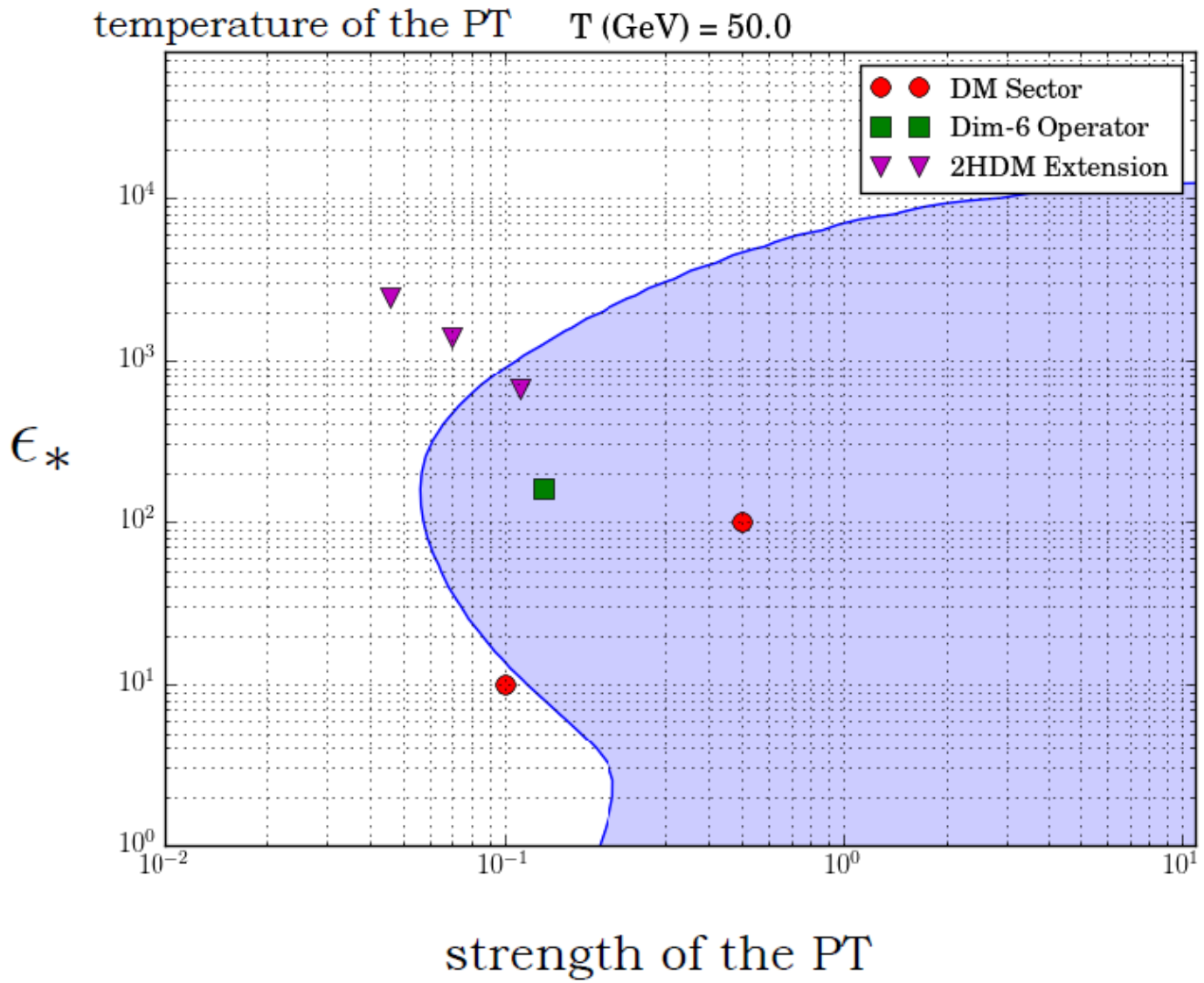
* Nature des trous noirs: primordiaux ou stellaires?

because of the weakness of the gravitational interaction the universe is transparent to GW

$$\frac{\Gamma(T)}{H(T)} \sim \frac{G^2\,T^5}{T^2/M_{Pl}} \sim \left(\frac{T}{M_{Pl}}\right)^3 < 1$$

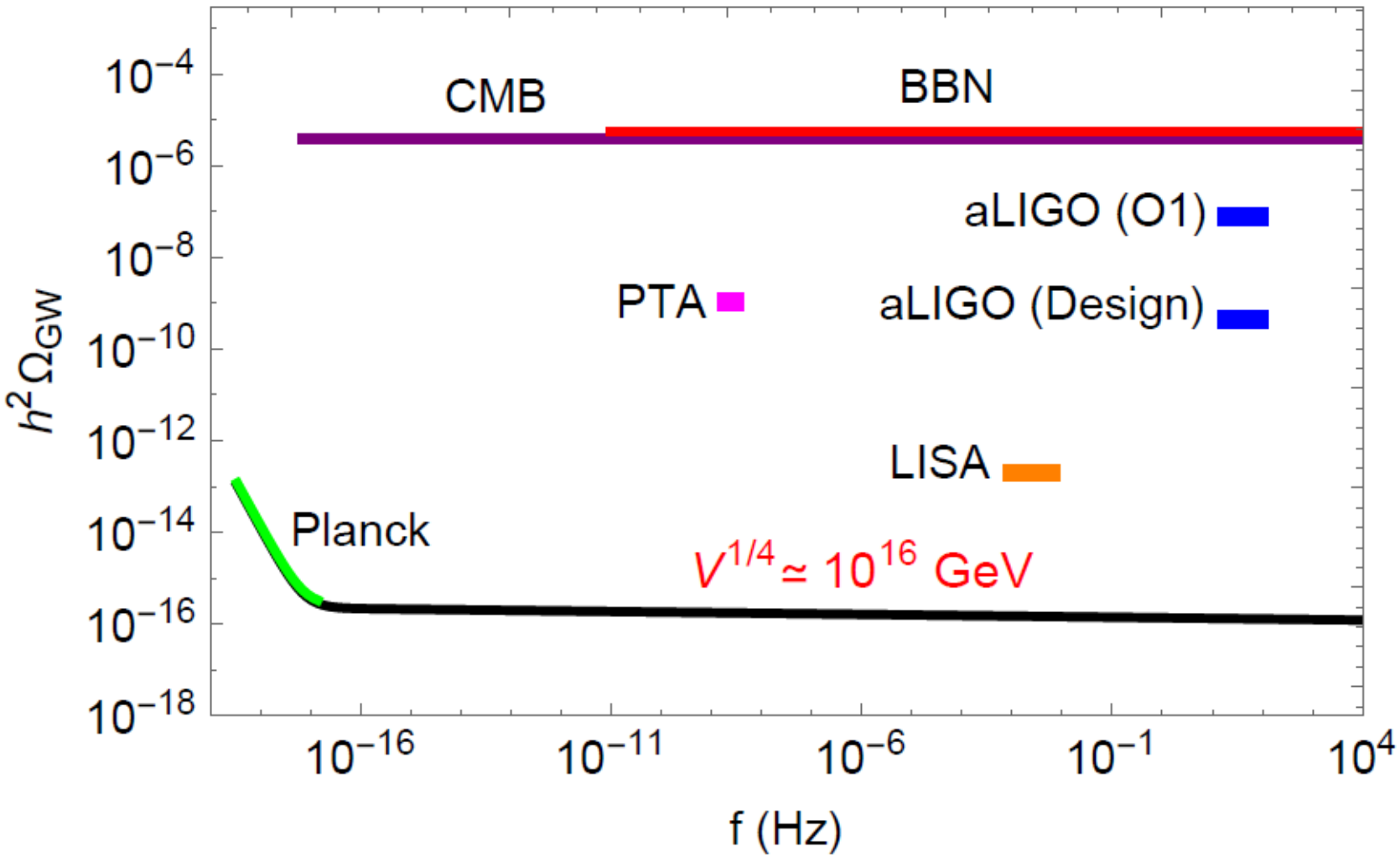


Example of detection prospects for LISA for EWPT: access to BSM physics!



Observational bounds/sensitivities for GWSB

signal from a *simple slow roll inflation model* :
beyond the reach of direct detection



“Non-standard inflation”