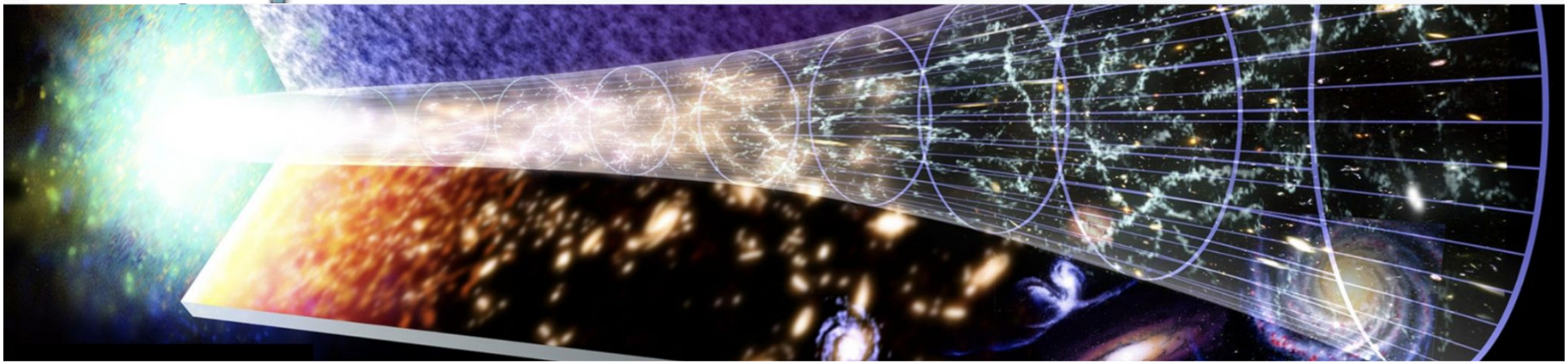
Cosmological Physics GDR



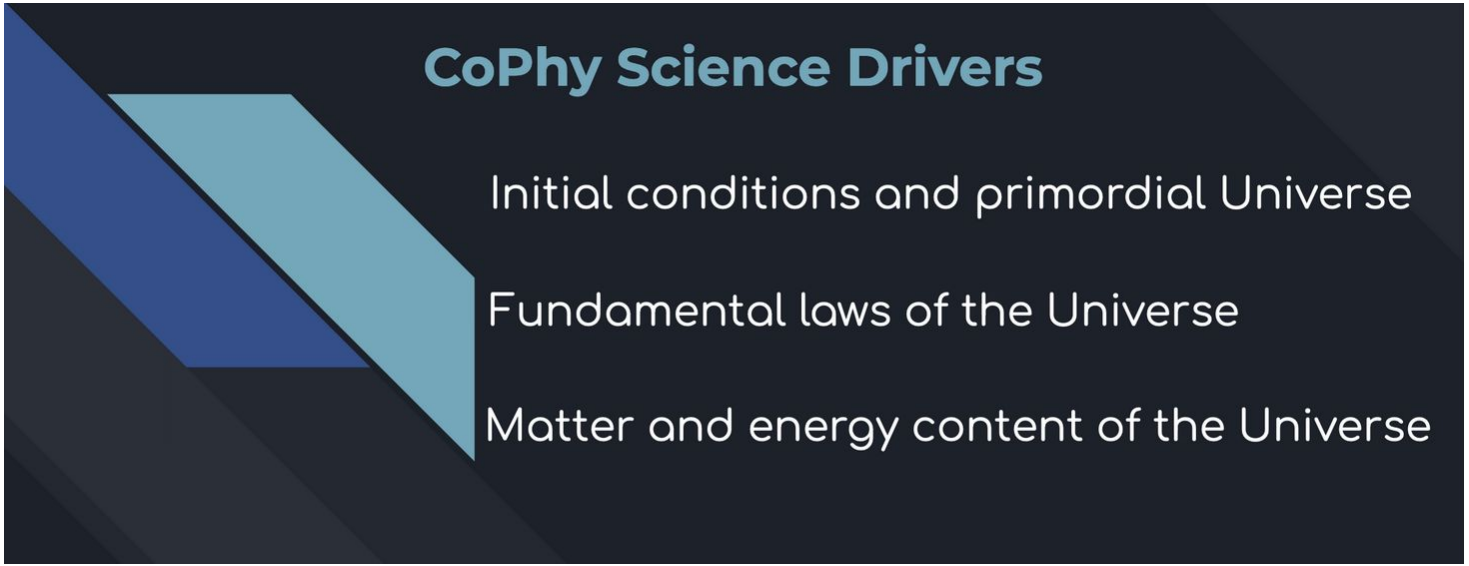
(*) GDR=”Groupement De Recherche”

https://gdrcophy.in2p3.fr/

ABOUT THE COPHY GDR

What is it ?

The Groupement De Recherche (GDR) CoPhy aims to bring together all actors working in the field of Cosmology in France, experimentalists, phenomenologists and theorists, and to provide opportunities for meetings and joint discussions. It will contribute to promote and give visibility to young researchers in the field.



Science Drivers

Initial conditions and primordial Universe

The Inflation paradigm has been introduced as a possible solution to the hot Big Bang model problems. The last results from the Planck collaboration show that there is no evidence for dynamics beyond slow roll, while slow-roll inflationary models for large fields are already ruledout. The remaining single-field models (including the simplest and well-motivated R+R2 Starobinsky model) predict a tensor-to-scalar ratio of a few 10-3. That corresponds to the sensitivity target of the future CMB projects. But the quest for a better understanding of the early phases of the Universe requires to go far beyond this result.

Fundamental laws of the Universe

One of the key discoveries, at the turn of the century, has been the acceleration of the expansion of the Universe. Still, today, the underlying physical processes are yet to be understood. To go beyond the standard parameterisation through a cosmological constant or a fluid with a distinctive equation of state, one of the current hypotheses is the modification of General Relativity (GR) on cosmological scales. Such a modification could also solve the problem of the singularities inherent to GR as well as our inability to formulate a quantum version of GR.

Matter and energy content of the Universe

Cosmology gives insights on Dark Energy, but also on Dark Matter and neutrinos as different types of particles with different masses, interaction and decay properties do affect the power spectrum (or correlation function) at characteristic scales. his represents a unique opportunity to test the robustness of the ΛCDM model and look for new particles or fields beyond the high-energy (particle) physics standard model.

Science Drivers

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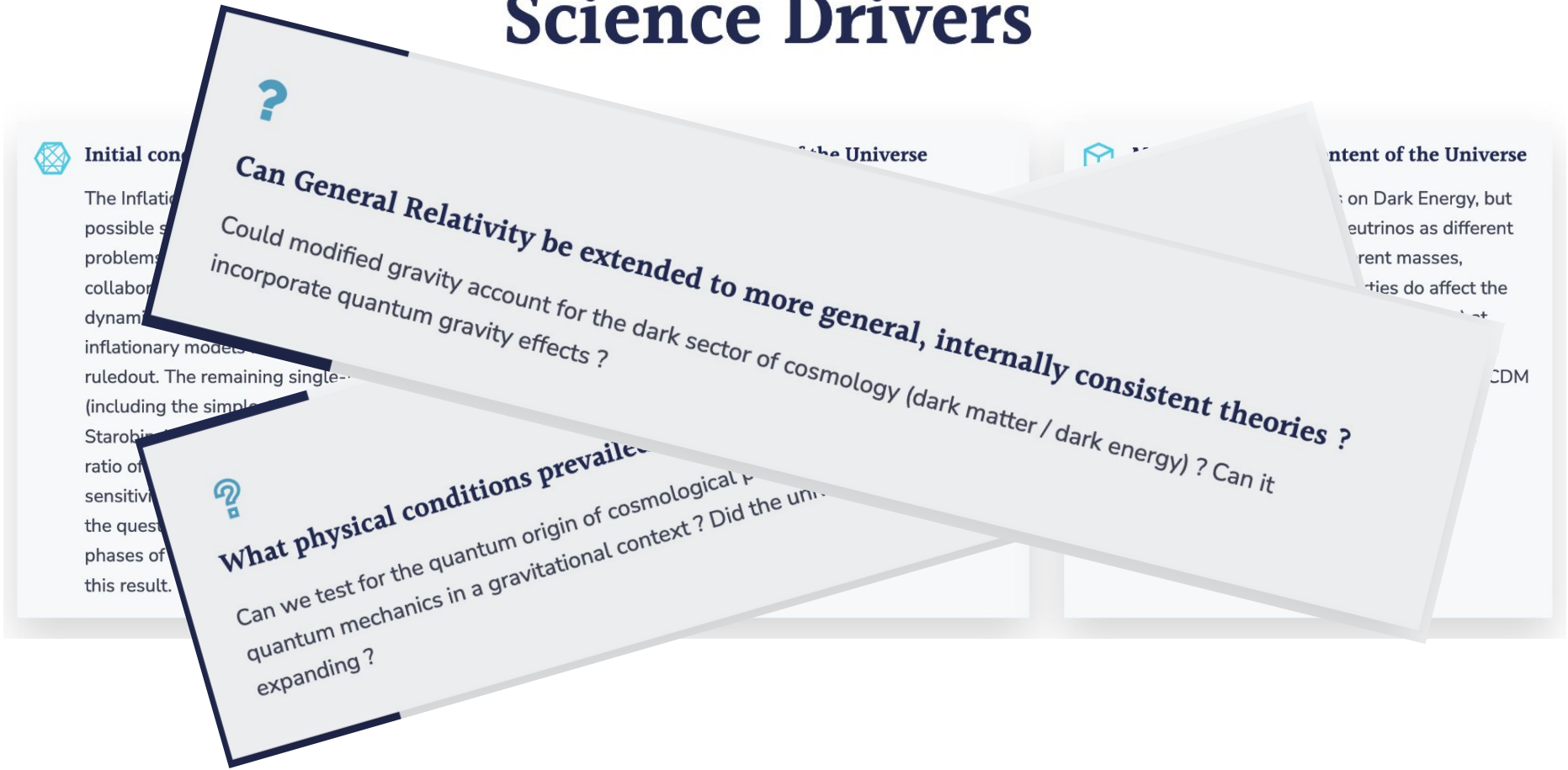
What physical conditions prevailed in the very early universe?

Can we test for the quantum origin of cosmological perturbations ? What does it tell us about the nature of quantum mechanics in a gravitational context ? Did the universe undergo a phase of contraction before expanding ?

Science Drivers



Science Drivers

Science Drivers

Working Groups

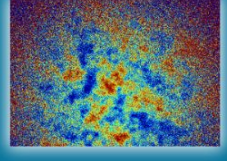
Colloque national CMB-France

TUG

Main principles:
* build on existing initiative
* not reinvent the wheel
* Enlarge the topics of the ADE Tools WG => a GDR WG

Dark Energy

The Dark Energy Working Group



CMB

The Cosmic Microwave Background Working Group

TUG

The Theory, Universe and Gravitation Working Group

Tools

The Tools and Methodology Working Group

\+ add **Transverse Task Forces** based on the needs - to be discussed at the first meeting

GDR Coordination Team

For a period of 4 years (starting Jan. 2023), the GDR is coordinated by Sophie Henrot-Versillé as director, and Samuel Boissier and Vincent Vennin acting as deputy directors, together with a steering commitee composed of Working Groups coordinators

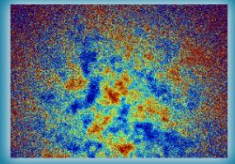
Dark Energy

The Dark Energy Working Group

Alain Blanchard

Philippe Brax

Pauline Zarrouk



CMB

The Cosmic Microwave Background Working Group

François Bouchet

Matthieu Tristram

TUG

The Theory, Universe and Gravitation Working Group

Vivian Poulin

Pasquale Serpico

Tools

The Tools and Methodology Working Group

Guilhem Lavaux

Yann Rasera

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ENSURE AND STRENGTHEN THE SCIENTIFIC ANIMATION IN COSMOLOGY IN FRANCE	**IDENTIFY AREAS IN WHICH NEW TASK FORCES AND WGS SHOULD BE CREATED**	**PARTICIPATE IN ROADMAP EXERCISES IF AND WHEN REQUIRED**	**COORDINATE WITH OTHER RELATED GDR AND IRN**
Alain Blanchard Philippe Brax Pauline Zarrouk	François Bouchet Matthieu Tristram	Vivian Poulin Pasquale Serpico	Guilhem Lavaux Yann Rasera

General Meetings

Coming *soon !!*

We are currently organising the first CoPhy GDR meeting..

It will take place in the Paris area

on the 17th. 18th and 19th of January 2023 !

You can find the agenda there:

HTTPS://INDICO.IJCLAB.IN2P3.FR/EVENT/8881/

the agenda will be regularly updated
do not hesitate to visit it some time to time