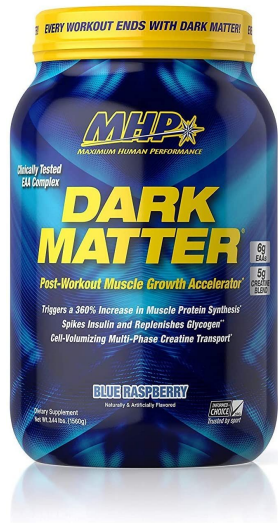


## Our ambitious mission :

- Show the **state of the art** of the physics of rare events
- Cover for both **experimental** and **theoretical** aspects
- Provide hints for the exploration of next generation experiments (link with [WG5](#))
- Provide a guideline for experimental and technological efforts, like constraints for low cosmo- and radio-purity techniques([WG2](#)), for detection methods ([WG3](#)) and analysis tools ([WG4](#))
- **Being inclusive** to any other scientific field that would profit of deep underground sites

# Two major axes

## 1. Dark Matter



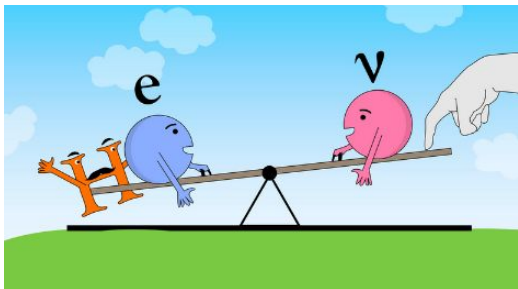
**We will keep a particular eye on direct search of dark matter :**

- Scoping the whole zoology of models (WIMP, WISP, axions, ...), nucleo- or lepto-philic
- Exploring a wide (and experimentally accessible) range of masses/energies (  $> \text{GeV}$ , sub-GeV, down to  $\mu\text{eV}$ )
- Looking for any trace of daily and seasonal modulation
- Using a plethora of targets and combinations of energy losses
- Complementarity with colliders (new particles) and indirect evidences (annihilation)

# Two major axes

## 2. Neutrinoless double beta decay

**We will keep an eye on the search for the intimate nature of neutrinos :**



- Nature of neutrino (Majorana/Dirac)
- Fixing the neutrino mass scale and possible mass scenarii
- Proof of a lepton number violation
- Neutrino hierarchy
- Impact on baryon asymmetry of the Universe via Leptogenesis

**Many other challenges and synergies, some of them scoping physics beyond Standard Model :**

- Double electron capture
- Proton stability
- Solar neutrino flow
- Coherent elastic neutrino-nucleon scattering
- Contribution to detection and study of supernovae properties
- Geo-neutrinos
- Sterile neutrinos

**Our mission naturally includes the connection with other communities :**

- GDR Neutrinos (<http://gdrneutrino.in2p3.fr/>) for  $0\nu\beta\beta$  and any other low background physics
- GDR RESANET (<http://resanet.in2p3.fr/>) for nuclear physics processes
- GDR Terascale (<http://terascale.in2p3.fr/>) for particle physics beyond Standard Model
- Accelerator physics
- Cosmology
- Anything else related to underground physics (geology, biology, chemistry, ...)
- Finally, involving other institutes and countries

## Practically speaking, we plan to :

- Encourage people, especially young ones, to **present** freshly new theoretical and experimental results
- Coordinate the efforts for the preparation of a **biennial summary document** (ideally early 2023 and 2025) with the state of the art of the field (form to be defined: short communication, activity report, ...)
- Develop and maintain a **web page** (in GDR web site or linked to it) with a collection of the existing experimental results (as a form of publications, oral talks and summary plots)
- **Promote** round tables, seminars, outreach events

We count on [you](#)  
to have this WG  
active and stimulating



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and scientific news  
to present at next  
meetings