

Summary of the  
Workshop on future challenges and  
opportunities in QG-MM



11–12 July 2022

# Main Topics

- Multi-messenger approaches and strategies
- Contents of the white paper
- Discussion on data availability
- Discussion on alternatives for an Action follow-up

# Multi-messenger approaches and strategies

- Agustín Sánchez Losa reviewed the **different detection strategies** for the cosmic messengers and **future updates** of present experiments
- It was remarked the **complementarity** between different detectors (e.g., neutrino detectors in different hemispheres)
- **Challenges** for correlation and combined studies: energy and time calibrations, definition of time windows, understanding of angular and energy uncertainties
- Need to **promote combined analyses**, as with the LIV consortium, for other messengers; they should not depend much on astrophysical models, and allow for a certain tolerance in the identification of the sources

# White paper discussion

- State the target: **what kind of effects** we are looking for?
- Identify the main obstacles in the studies made in the review. **What do we need to increase?**
- Identify the **sources of uncertainties** and propose new techniques or statistical methods to deal with them
- Push forward **open data** policies
- Make contact with different scenarios in the **accompanying papers**

# Table of contents: White Paper

- Strong opening statement like “We are interested in the following effects, since they emerge from quantum gravity research, ...” “QG predict deviations from LLI like ...” (?)
- What kind of effect we are looking for?
  - Time delays
    - description of effect (refer to review)
    - main difficulties today to detect/constrain effect
  - anomalous threshold effects
    - description of effect (refer to review)
    - main difficulties today to detect/constrain effect
  - spacetime foam (with specific formulas for phenomenological effects)
    - description of effect (refer to review)
    - main difficulties today to detect/constrain effect
- Sources for uncertainties and competing effects
- Experimental requirements for QG research
  - flux measurements
    -
  - energy resolution
    - for time delays
    - for xxx effect
  - angular resolution
    - time delays
    - transverse effects
    - for xxx effect
  - energy range
    - for time delays
    - for threshold effects
    - for xxx effect
- Proposal for new measurement strategies for QG research
- Data availability & Collaboration between telescopes
- QG phenomenology beyond extraterrestrial observations (?)

# Discussion on data availability

- **Giovanni's proposal:** a section in the white paper with the message that we welcome the recent improvements on data availability and that we encourage experimental collaborations and funding agencies to give priority (even in the evaluation of projects) to good practices in data availability
- Rodrigo Gracia-Ruiz reviewed the **challenges** for data availability and the **attempts** by different experimental collaborations
- Cristiano Bozza described the **ESCAPE** (European Science Cluster of Astronomy & Particle Physics ESFRI Research Infrastructures) project and the services in data infrastructures for open access data it offers
- The discussion session showed some of the **difficulties** for open data access, both from the technical and procedural points of view

# Possibilities for an Action “follow-up”

- José Manuel indicated several possibilities, including applying for a “**Marie Skłodowska-Curie Training network**”. These build around a research project
- It was agreed to **build an entity** (a kind of “society for quantum gravity phenomenology”) so that the energy of the Action does not disappear with it
- Priority should be given to **face-to-face meetings** (e.g., an annual conference) with respect to online meetings
- We should **investigate**: EuCAPT, ISQG, EPS divisions