



The UHECR Snowmass White Paper Mini-workshop #2

Coordinators – F. Sarazin, F. Schroeder, T. Venters
Lead conveners – A. Coleman, J. Eser, E. Mayotte, D. Soldin



- The **UHECR** Snowmass white paper aims at identifying the scientific goals of the community looking out **two decades** in the future.
 - **UHECR**: for the purpose of this document $E > 100 \text{ PeV}$
 - **Why two decades?** Current experiments are going to operate for another decade, while most planned experiments are about one decade out and will need to operate 5-10 years.
- The white paper also aims at being a **baseline roadmap** for the community and therefore need to be **international** and (reasonably) thorough. We are aiming for a 70 - 100 pages document.



Multi-messenger astronomy in Astro 2020

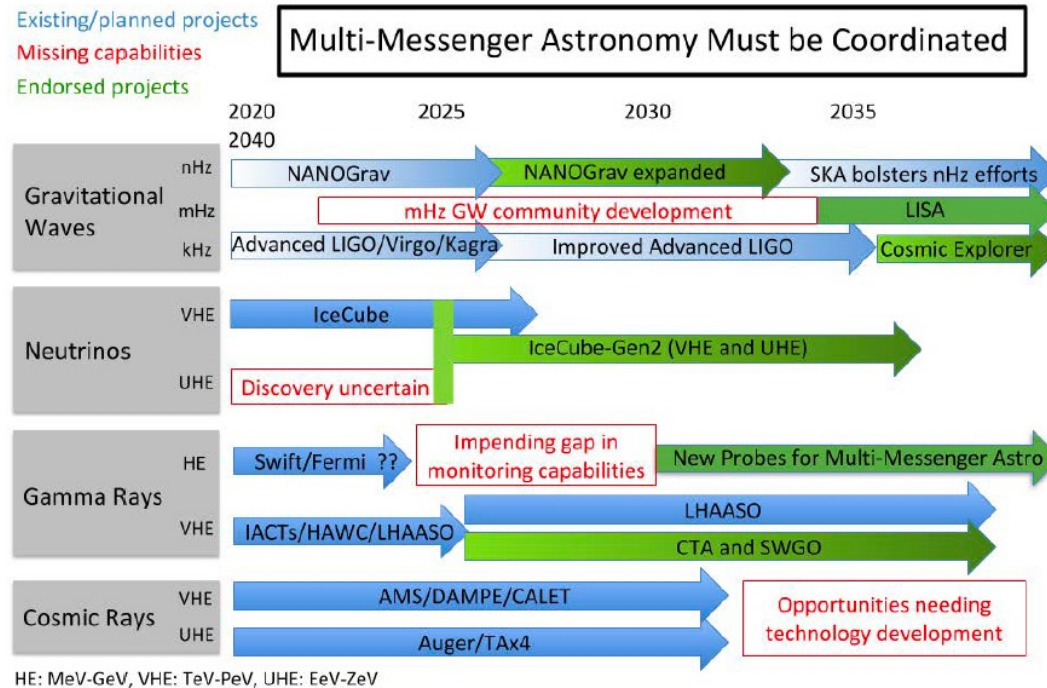


FIGURE L.4 Schematic high-level view of capabilities in different messengers over decades (blue: existing or planned, red: missing capabilities, green: endorsed new projects, dated by construction starts). Gradient shading indicates projects that can start taking data as construction proceeds. Not shown are many promising potential projects for which technology development is needed. With each messenger, the discovery prospects are outstanding; with multi-messenger observations, they could be transformative.



Goals of the mini-workshop

- **Update** the community on progress, with a special focus on the science
- **Present** the main findings of the science tasks
- **Discuss** how we intend to articulate the white paper around those findings
- **Close the loop** with the experiment representatives and next-gen experiment proponents



WP Coordinators: Fred Sarazin, Frank Schroeder, Tonia Venters

Lead Conveners: Alan Coleman, Johannes Eser, Eric Mayotte, Dennis Soldin

TASKS (2-3 conveners per task)

- **Spectrum** A. Coleman / Y. Tsunesada
- **Composition** D. Bergman / E. Mayotte / A. Yushkov
- **Anisotropy** L. Caccianaga / G. Golup / P. Tinyakov
- **Hadronic interactions** H. Dembinski / T. Pierog / D. Soldin
- **Multimessengers** J. Alvarez-Muniz / J. Eser / L. Lu
- **Astrophysics** F. Oikonomou / T. Venters
- **Magnetic fields*** T. Jaffe / M. Unger
- **BSM (dark matter,...)*** R. Aloiso / O. Deligny
- **Computation*** J. Glombitza / E. Santos / A. Haungs
- **Interdisciplinary** M. Bertaina / R. Mussa

EXPERIMENTS (1 representative per experiment)

- **Auger** A. DiMatteo
- **Ice Cube (incl. Gen 2)** J. Kelley
- **Telescope Array** J. Matthews
- **GCOS** J. Hoerandel
- **GRAND** P. Denton
- **POEMMA (& EUSO)** J. Krizmanic



Timeline

- White paper coordinators and lead conveners named Sept 15 ✓
- Identify & contact the conveners and experiment representatives Oct 10 ✓
- Create an outline of the white paper. Inform the community. What is the best structure to be also used for a community-wide roadmap document? Encourage contributions from the community! Oct 20 ✓ (mini-workshop)
- Deadline for individual contributions to the various tasks Nov 20 ✓
- Report from each science tasks (<10 pages) & experiments (<5 pages) due Dec 10 ✓
- Update the suggested requirements on future experiments based on the science task and experiment reports. Request information from the experiment representatives to make (comparative) plots. → We are here! Dec 15 to Jan 15
- Include new plots, update experiment section and conclusion of paper. Jan 20 ✗
- Draft of the white paper is released for general review Jan 31 – slipping
- Solicit external reviews Mar 1
- Submit to Snowmass CF7 Mar 15

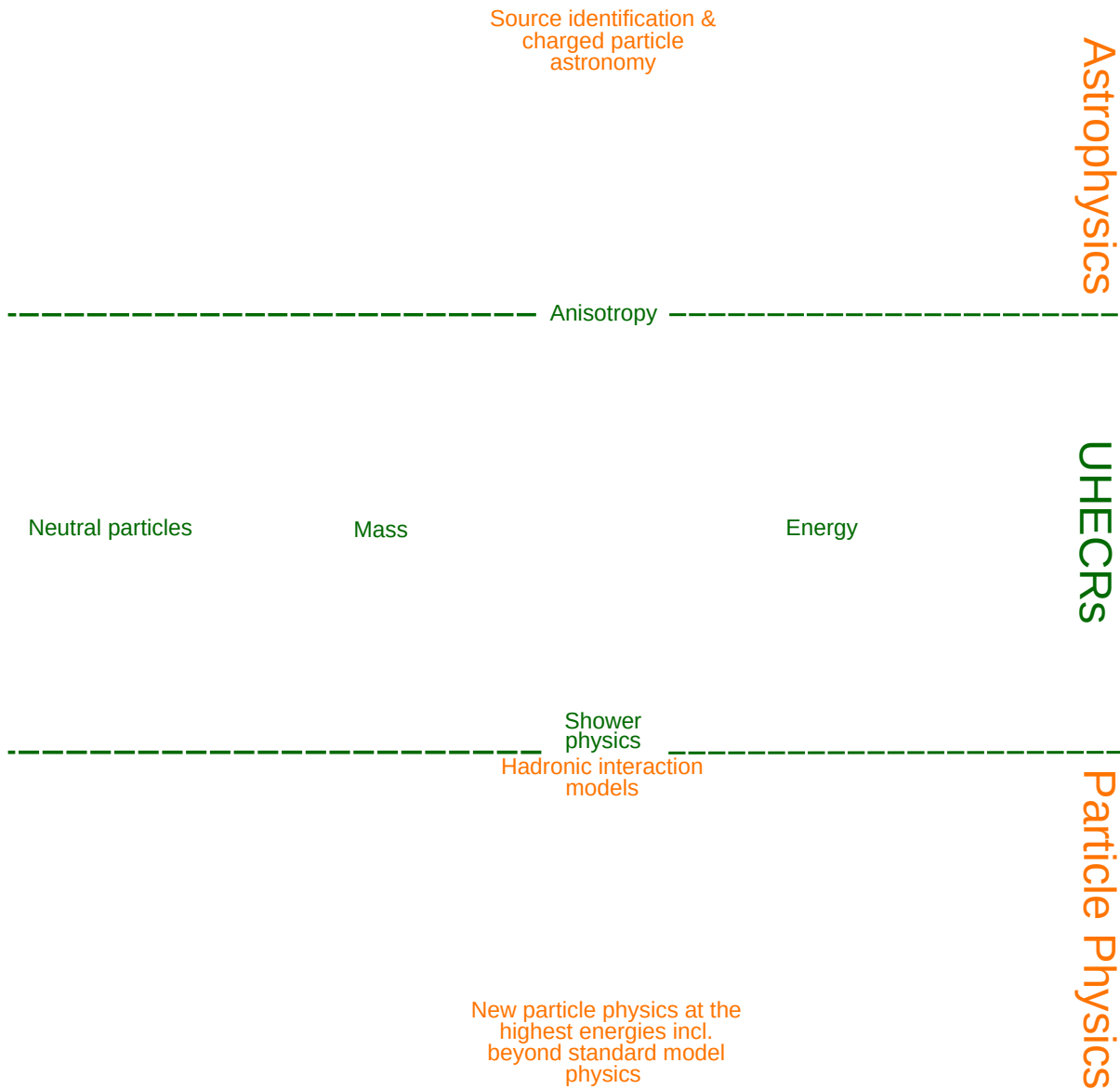


Preliminary Outline

Executive Summary (1 page)

1. The Big Questions
2. The UHECR Paradigm Shift
3. Physics at the Energy Frontier – the synergy between UHECRs and Particle Physics
4. Pinpointing the Most Extreme Physical Processes in the Universe
5. Stepping Up to the New Challenges
6. The Next Generation Experiments
7. Interdisciplinary science

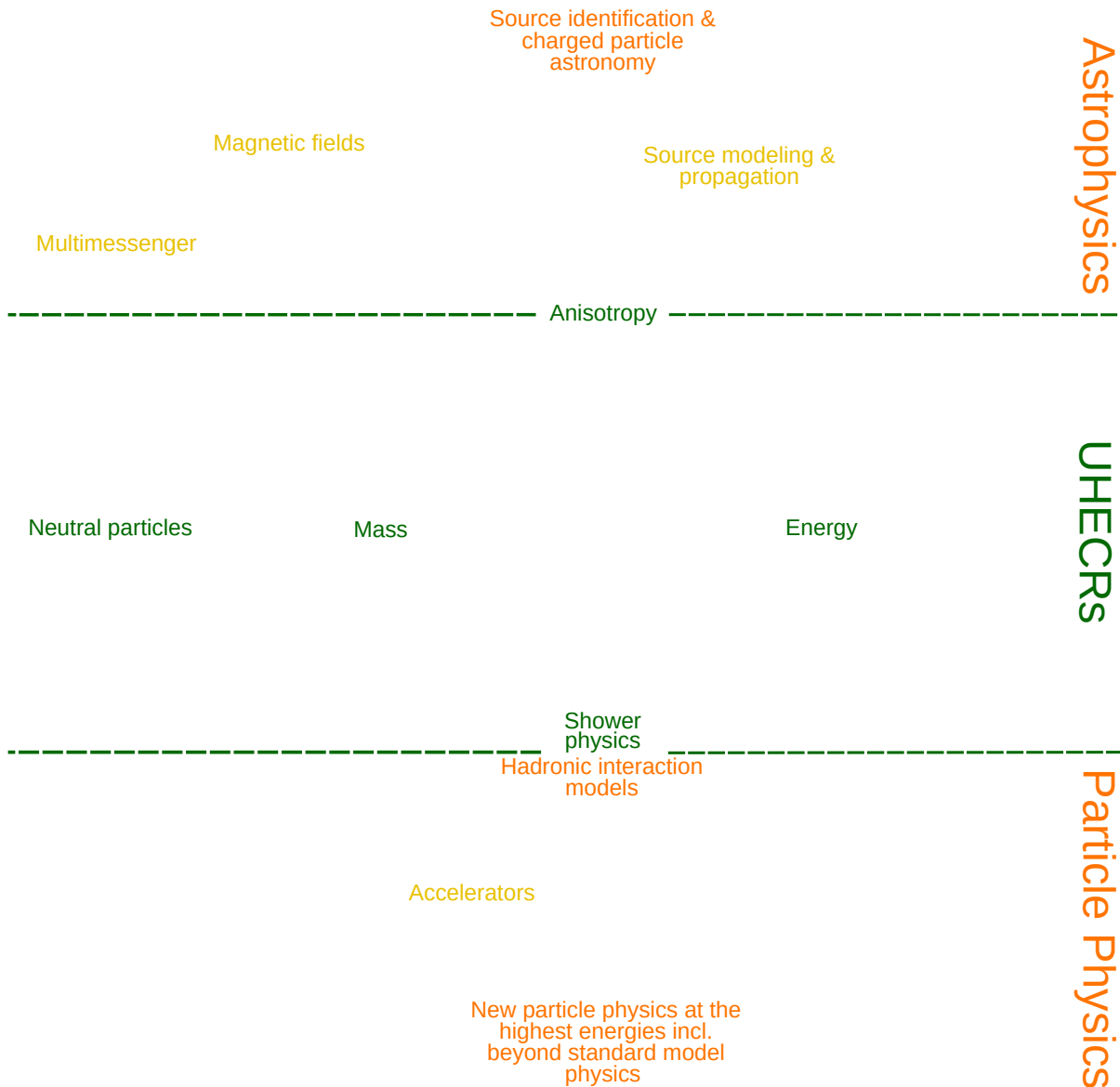




Articulating the white paper

The starting point:

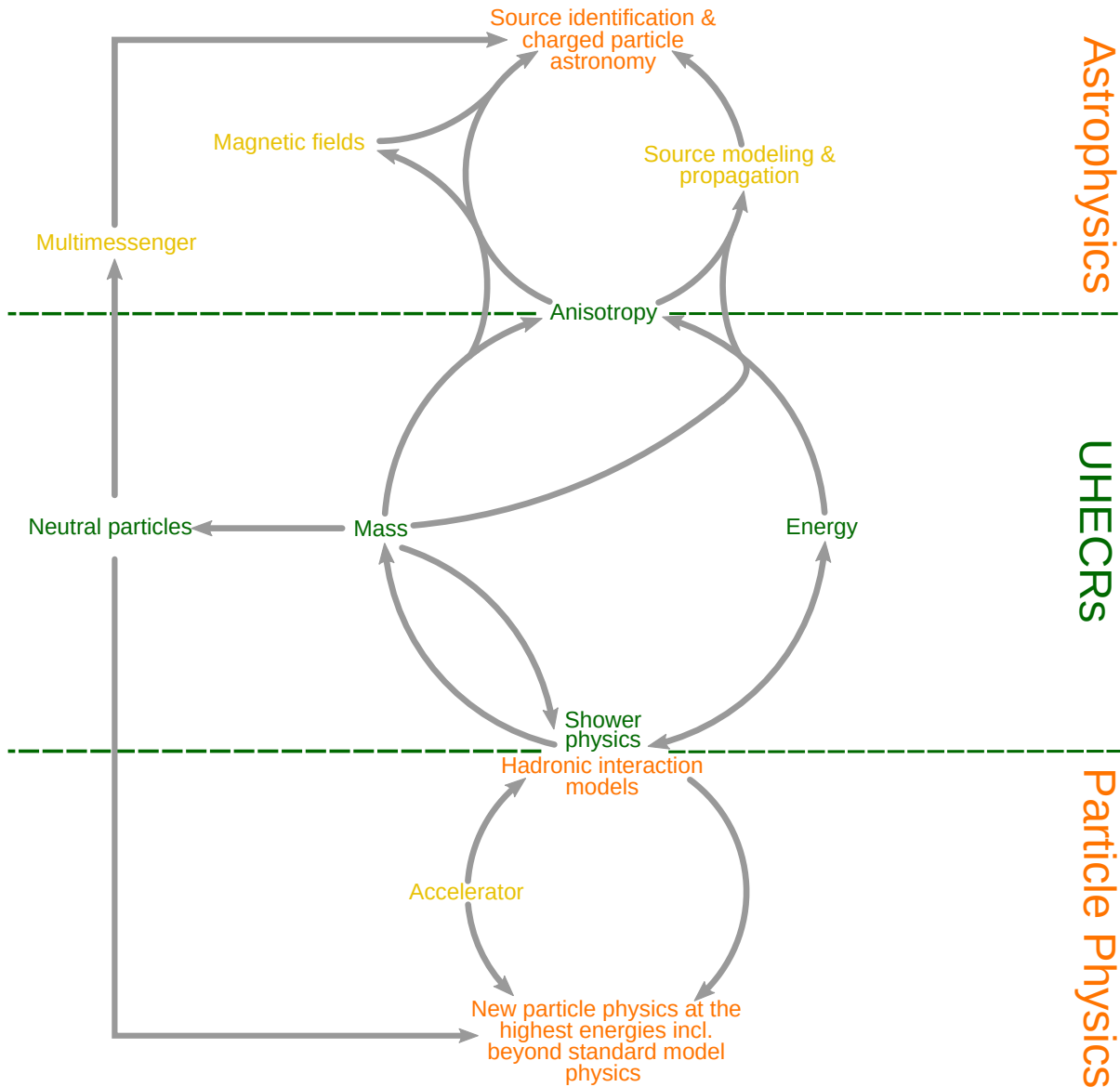
- UHECRs observables and goals



Articulating the white paper

The starting point:

- UHECRs observables and goals
- Adding related fields



Astrophysics

UHECRs

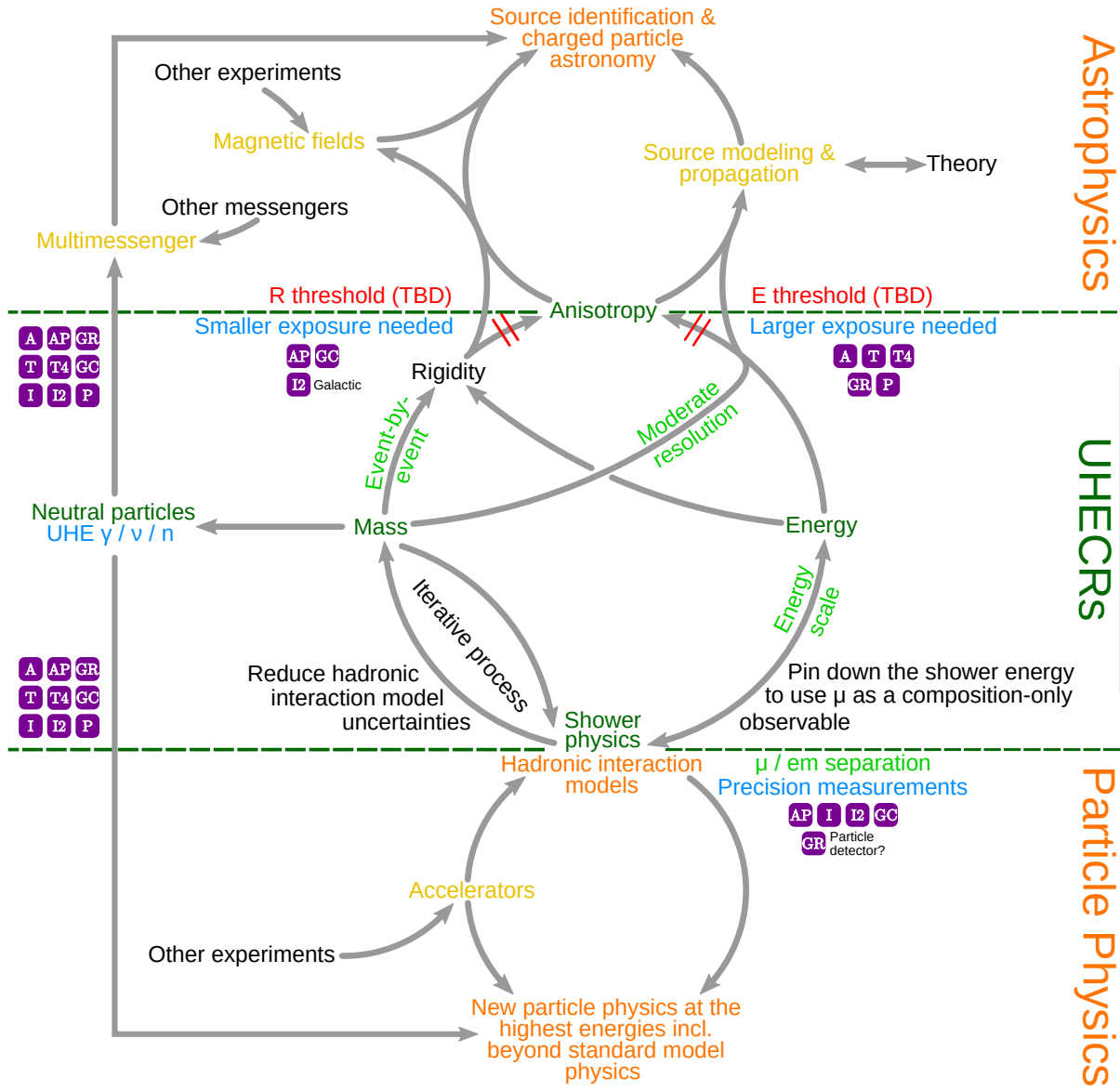
Particle Physics

Articulating the white paper

The starting point:

- UHECRs observables and goals
- Adding related fields
- Draw the connections

Preliminary



The complete picture?

- UHECRs observables and Goals
- Adding related fields
- Draw the connections
- Identifying the strategies and where experiments (will) contribute