

## Cosmic messengers

- Merge physics priorities at ultra-high energies with accelerator programs
  - Cosmic neutrino's
  - Charged particles
- What *particle* physics aspects do we learn from multi-messenger physics?
  - Improve collaboration between PP & APP
  - Benefits of theory centre for Astroparticle Physics
- Is a stronger collaboration between APPEC and CERN beneficial?
- Improve the governance to realize APP projects faster - role for CERN?

## Gravitational Waves

- How relevant is the physics of Gravitational Waves
  - Strong field gravity test of Einstein theory of general relativity
  - New understand Dark Sector of the universe?
  - Neutron Star mergers valuable info for QCD eos
  - JGW opens a new window on the universe with high impact on particle physics?
- Connection to CERN
  - Clear request from ET to get CERN involved
  - What is benefit for CERN for becoming active in the Einstein Telescope?
- New community
  - Staff positions on GW appear all over Europe. Are the science prospects and R&D challenges enough to fulfill all their dreams?

## Einstein Telescope

...and the match to the expertise of a leading particle physics lab like CERN

**Vacuum:** Vacuum systems for planned 3G detectors will be the largest UHV systems ever conceived (total volume  $\sim 10^3\text{m}^3$ ) and will account for a substantial fraction of the cost

**Cryogenics:** The cryogenic cooler must deliver an extremely low noise, steady cooling power of  $\sim 100\text{mW}$  at 10K to the mirror, and must be flexible to support operation

**Controls and automation:** Control systems for gravitational wave detectors and particle accelerators share the need to control multiparameter systems with a high degree of complexity

**Electronics, DAQ:** Gravitational wave interferometers are complex opto-mechanical systems, which need to be complemented with vast amounts of electronics

**Underground facilities:** Minimizing the site facility and infrastructure influence on performance

**Governance:** Ranging from management technology transfer to realization and management of ET