Summary of ICCUB Activities in Einstein Telescope & Proposed Strategic Actions

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Executive Summary: Current Status at ICCUB

- **Institutional Context:** GW physics is one of three Grand Challenges in the María de Maeztu Unit of Excellence at ICCUB ($\sim$170 total personnel).
- **Collaboration Footprint:** 19 listed members in the ET collaboration across OSB, ISB, eIB, and Infra-Dev.
- **Current FTE Commitment:**
  - Total pledged effort: **1.25 FTE** spread across 4 Core members.
  - Dilution across the remaining 15 members (average < 0.05 FTE/person).
- **Activity Profile:** Highly dominant in theoretical and observational astrophysics (OSB); minimal direct involvement in hardware/instrumentation (ISB).

Distribution of Effort across ET Divisions

ET Division / Unit	Pledged FTE
OSB Div 6 (Nuclear Physics)	0.60
OSB Div 2 (Cosmology)	0.20
OSB Div 4 (Multimessenger)	0.20
OSB Div 1, 3, 7, 8, 10	0.10
ISB, eIB, Infra-Dev	0.15
Total (4 Core Members)	**1.25**

- **48% of effort** concentrated in Nuclear Physics (Div 6).
- **Over 85% of effort** focused purely on observational/theoretical science (OSB).
- **Only 0.15 FTE total** dedicated to Instrument Science (ISB), Computing (eIB), and Infrastructure (Infra-Dev).

Current Scientific Strengths (OSB Focus)

- **Dense Matter & Neutron Stars (Div 6):**
  - Equation of State (EoS) thermal effects, hyperons, and phase transitions in mergers.
  - Bayesian parameter estimation task force and joint NR simulations (with Univ. of Valencia).
- **Cosmology & Early Universe (Div 2):**
  - Stochastic GW Background (SGWB) reconstruction (ET + LISA synergies).
  - Primordial black holes (PBHs), inflation, and scalar-induced GWs.
- **Multimessenger Follow-up (Div 4):**
  - VHE gamma-ray synergies (CTAO, MAGIC, LST) and optical/IR follow-up (BlackGEM, REGALADE catalogue, ELT/Gemini).
- **Populations & Waveforms (Div 1, 3, 8, 10):**
  - Binary black hole (BBH) dynamics ($z \geq 10$), gravitational microlensing, tidal resonances.

Current Technical & Hardware Status

- **Data & Computing (eIB):** Contributions rooted in past LVK data analysis experience.
- **Technological Unit Contributions:**
  - Development of the **LISA Radiation Monitor** (jointly with IEEC/ICE) to monitor cosmic ray charging of test masses.
  - Front-end electronics experience in high-energy physics (BabyIAXO, LHCb, CTAO).
- **Direct contributions to ET Instrument Science Board (ISB) hardware work packages remain minimal (only ~ 0.15 total FTE including computing).**
- **No current direct involvement in core ET optical systems, laser interferometry, or mechatronic controls.**

Proposed Action Plan: Strengthening Hardware & Participation

1. **Consolidate Core Dedicated FTEs:**
   - Re-evaluate membership to ensure committed members hold at least 0.20 FTE each.
2. **Leverage the Technological Unit for ISB Deliverables:**
   - Position ICCUB to lead specific hardware packages: low-noise front-end electronics, DAQ systems, or environmental/radiation monitoring units.
3. **Expand Optics & Mechatronics Expertise:**
   - Build strategic partnerships with local experimental optics groups to enter interferometric/suspension subsystems if possible.
4. **Secure Dedicated ET-Spain Hardware Funding:**
   - Target upcoming national grants specifically for hardware engineer positions tied to ET deliverables (need more HR!).

More Human Resources

- **New Hiring:** Senior Experimental Physicist in Gravitational Waves (Initially as Distinguished Professor → Permanent Professorship).
  Strategic Objective: Lead ICCUB's experimental contribution to ongoing and future GW detectors, with a key focus on the **Einstein Telescope**.
- **New Hiring:** Postdoctoral position with shared time between LISA and ET
- **ICREA candidates** Good candidates in GW will be given priority

Senior experimental position in Gravitational Waves at ICCUB- University of Barcelona

The Institute of Cosmos Sciences of the University of Barcelona (ICCUB), a Maria de Maeztu Unit of Excellence, is seeking a senior experimental physicist in Gravitational Waves to lead the experimental contribution of the Institute in ongoing and future GW detectors, especially in the future Einstein Telescope.

This recruitment is part of ICCUB's strategy to expand its involvement in gravitational-wave instrumentation and strengthen its Advanced Technology Unit.

Scientific environment

ICCUB has a strong scientific foundation in areas closely connected to gravitational-wave astronomy, including nuclear astrophysics, black-hole physics and observational astrophysics. Its existing activities include participation in Virgo data analysis and dedicated research on gravitational-wave lensing. In addition to its science program, ICCUB contributes to the LISA mission through the construction of radiation monitors.

The new appointment is intended to build on these complementary strengths, expanding ICCUB's experimental capabilities in gravitational-wave instrumentation and fostering synergies between its scientific research groups and Advanced Technology Unit.

The position

The selected candidate will be initially contracted as Distinguished Professor at the University of Barcelona for up to two years. During this period the selected researcher will need to obtain the accreditation needed to become a permanent professor as required by local and national regulations (save if he or she is already accredited). The position will eventually transform into a Professorship with full rights and obligations.

The selected candidate is expected to lead the participation of the ICCUB in Gravitational Waves.