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Working Group Questions

1. How does the mass function of primordial black holes evolve in time?

- What are the relevant physical processes (accretion, evaporation, mergers,…)?
- How would you write a PDE that captures such processes?
- Can you discretize such PDE for the case of an initial quasi-monochromatic mass function?
- How would you embed the PDE describing the mass function evolution in an expanding universe?
- Can you describe ways to test the evolution of the PBH mass function?

2. Can dark matter absorb light?

- Describe physical models where dark matter could absorb light from a background source, producing potentially detectable spectral features
- Which wavelengths are most promising, and why?
- Which dark matter masses are most promising, and why?
- Which instrumental features would be most critical (energy resolution, angular resolution, field of view, observing time)?
- Would potential models that absorb light also emit light? How?

3. What do we know about high-energy cosmic-ray electrons?

- Several experiments (most recently AMS-02, HAWC and DAMPE) have provided detailed measurements of high-energy (>100 GeV) cosmic-ray electrons (HECRE)
- Infer the most likely distance and age of a point-like source (in space and time) that could be responsible for HECRE data
- Estimate the degree of anisotropy in the HECRE arrival direction, assuming standard diffusion
- Estimate the gamma-ray luminosity if the source is continuous
- HAWC data imply very inefficient diffusion in pulsar wind nebulae: estimate as a function of the radius of the inefficient diffusion region how a discontinuity in the diffusion coefficient would affect the flux at Earth