APC colloquium

Wenesday, April 24 at 11am

Room Klimt, 366A

The Extragalactic Multi-Messenger Spectrum: Lessons From Propagation of Astroparticles

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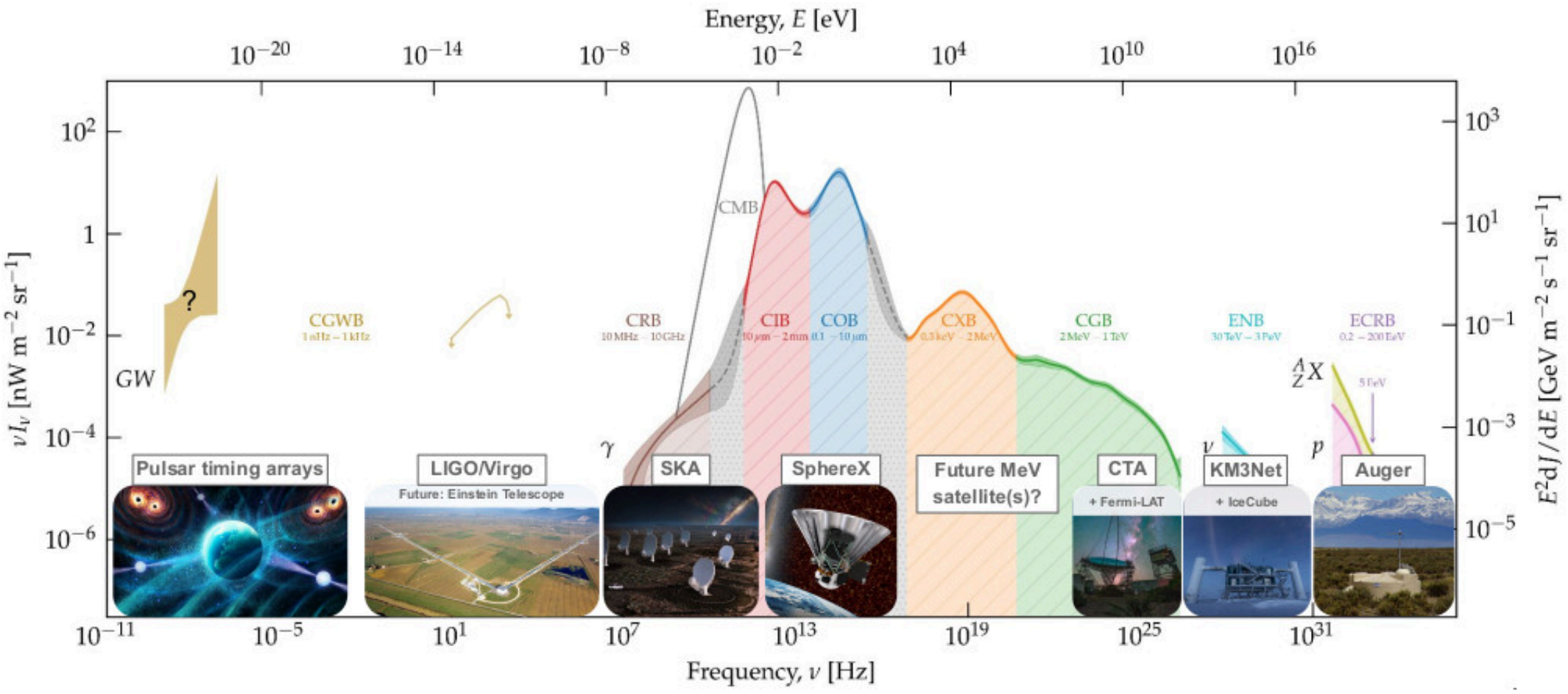

Our understanding of the radiation record of the universe has advanced dramatically over the past ten years. The brightness of the extragalactic sky is now measured in photons, neutrinos and cosmic rays by observatories on the ground, in the depths of the sea and ice, by satellites orbiting the Earth, and by probes at the edge of the solar system. The combination of their measurements allows us today to estimate the energy density of most of the components of the extragalactic background with an uncertainty better than 30%. Such accuracy is critical to our understanding of extragalactic source populations and of the origin of their power, whether from stellar evolution, black-hole accretion or ejection. This talk will focus in particular on recent advances in two components of the extralagactic multimessenger spectrum, which rely heavily on our understanding of astroparticle propagation on Mpc to Gpc scales. The most intense component, covering the optical and infrared domains, has been the subject of controversy over the past two decades. I will show that recent discoveries show a remarkable convergence between the three independent measurement methods, suggesting that we are on the way to obtaining a census of thermal emission since the end of the Dark Ages. The highest-energy component of the extragalactic spectrum, with frequencies 18 times higher than those of visible photons, is probably one of the least understood. Recently observed small-amplitude anisotropies at large and intermediate angular scales suggest that the discovery of the most extreme accelerators in the Universe is within reach.