Charis Anastopoulos (University of Patras, Greece): *Quantum nature of gravity from table-top experiment*

Abstract: We have little experimental information on how gravity acts on quantum systems, in particular regarding characteristic quantum properties like superposition or entanglement. This regime will be accessible by table-top experiments in the near future. First, I describe the most conservative expectation that such phenomena can be described by non-relativistic quantum theory that incorporates the Newtonian force. Then, I present alternative theories for such phenomena, including ones that treat gravity as a fundamental classical force. I also explain which classes of theories that can be ruled out by experiments, and I explain why a conclusive experimental proof of the quantum nature of gravity is out of reach. Finally, I argue that, nonetheless, in the longer term, desktop experiments can distinguish between the predictions of different quantum gravity theories.