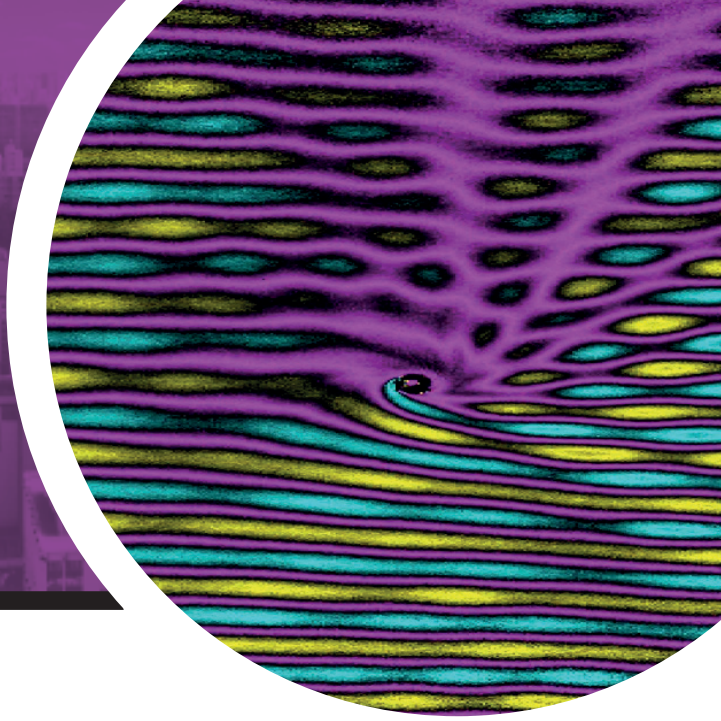
ICTP SAIFR | International Centre for Theoretical Physics South American Institute for Fundamental Research

CHALLENGES FOR WITNESSING QUANTUM ASPECTS OF GRAVITY IN A LAB



June 7-11, 2021

by videoconference

SPEAKERS

Nancy Aggarwal (Northwestern University, USA)
Markus Arndt (University of Vienna, Austria)
Markus Aspelmeyer (University of Vienna, Austria)*
Peter Barker (University College London, UK)
Daniel Carney (Lawrence Berkley lab, USA)
Brian D' Urso (Montana University, USA)
Ron Folman (Ben Gurion University, Israel)
Jan Harms (Gran Sasso Institute, Italy)
Jack Harris (Yale University, USA)
Bas Hensen (University of Delft , The Netherlands)
Myungshik Kim (Imperial College, UK)
Timothy Kovachy (Northwestern University, USA)
Tong Chang Li (Purdue University, USA)
Yair Margalit (MIT, USA)
Chiara Marletto (Oxford University, UK)
Ryan Marshman (University College London, UK)
Samir Mathur (Ohio State University, USA)
David Moore (Yale University, USA)
Gavin Morley (Warwick University, UK)
Holger Muller (Berkley, USA)
Martin Plenio (University of Ulm, Germany)
Carlo Rovelli (Aix-Marseille University, France)
Jacob Taylor (NIST-Baltimore, USA)
Marko Toros (University of Glasgow, UK)
Hendrik Ulbricht (University of Southampton, UK)
Vlatko Vedral (Oxford University, UK)
Katheryn Zurek (Caltech, USA)*

**To be confirmed.*

Understanding gravity in the framework of quantum mechanics is one of the significant challenges in modern physics. Along this line, a primary question is whether gravity is a quantum entity subject to quantum mechanical rules. Despite the purported weakness of gravity, the phase evolution induced by the gravitational interaction of two-micron size test masses in adjacent matter-wave interferometers can detectably entangle them via the exchange of graviton mediation even when they are placed far enough apart to keep Casimir-Polder forces at bay. This prescription for witnessing entanglement certifies gravity as a coherent quantum mediator through simple correlation measurements between two spins: one embedded in each test mass known as a QGEM (quantum gravity induced entanglement of masses) protocol. This workshop will discuss various theoretical and experimental challenges to conceive the QGEM protocol in a lab that will require an unprecedented level of accuracy in witnessing the quantum nature of one of nature's weakest interactions.

There is no registration fee.

Registration deadline:
May 30, 2021

Online registration and more information:
http://ictp-saifr.org/qgem2021/

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