

Gravity and Holography

Supplementary Module, Semester 1

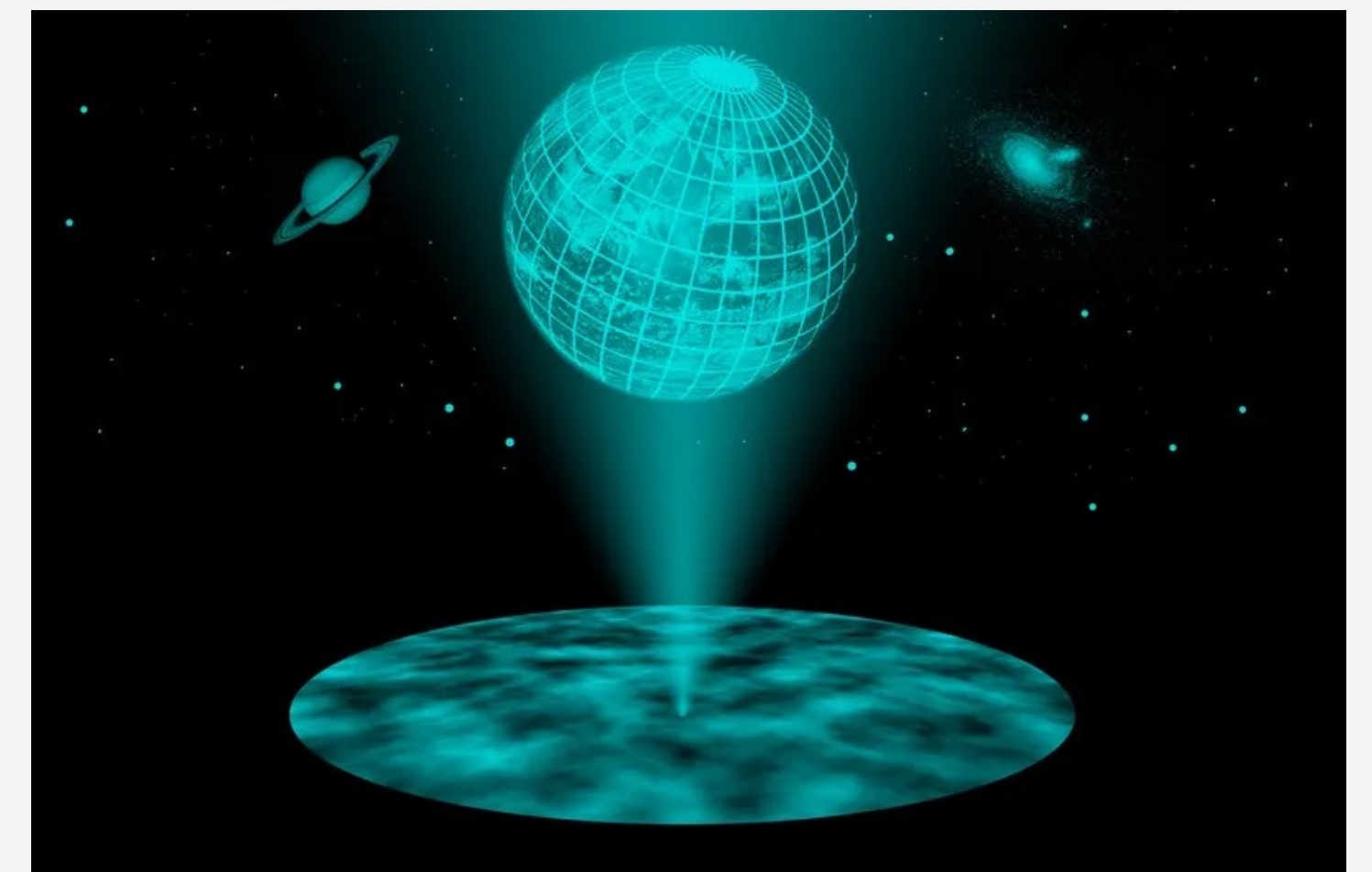
Lecturer: Matthew Walters (Heriot-Watt), m.walters@hw.ac.uk

Prerequisites:

- ✦ Quantum Mechanics, some Group Theory and Differential Geometry
- ✦ Quantum Field Theory very useful but not required
- ✦ Encouraged to take [Conformal Field Theory and Vertex Algebras](#) (Semester 1)

Useful Resources:

- ✦ Jared Kaplan, [“Lectures on AdS/CFT from the Bottom Up”](#)
- ✦ Raman Sundum, [“From Fixed Points to the Fifth Dimension”](#)
- ✦ João Penedones, [“TASI Lectures on AdS/CFT”](#)



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- ✦ Introduction to correspondence between **theories of quantum gravity** and **non-gravitational theories in one fewer spacetime dimension**
- ✦ “Bottom-up” approach: discuss universal features of gravity and how they can be reinterpreted in new language of conformal field theory
- ✦ Planned topics: Anti-de Sitter spacetime, conformal field theory, conformal bootstrap, Witten diagrams, black holes, finite-temperature physics, entanglement entropy, bulk locality, holographic renormalization

