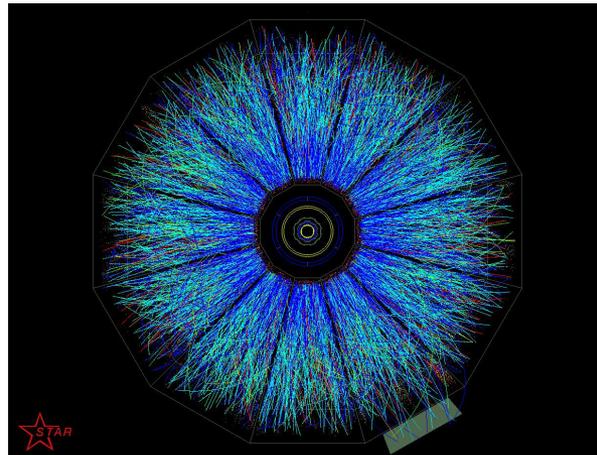
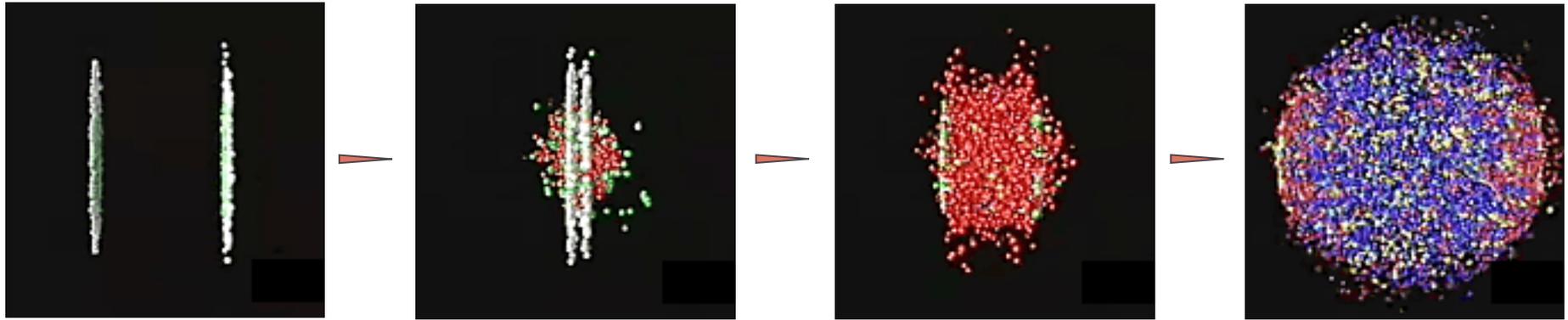


HOLOGRAPHIC DUALITY

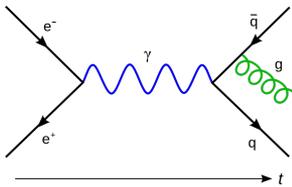
Matthew Stephenson
Stanford University

Heavy-ion collisions at the Large Hadron Collider in CERN

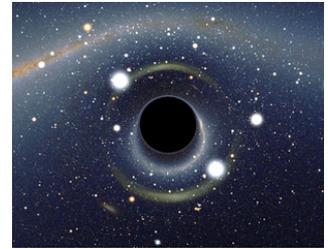


High-energy physics

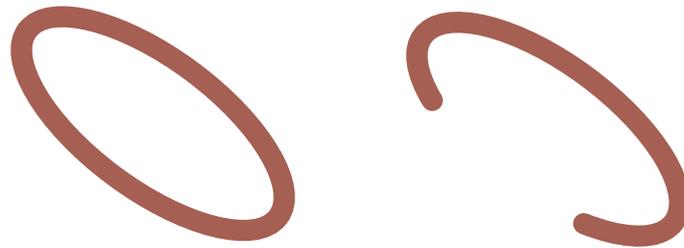
Quantum field theory



Gravity - General relativity

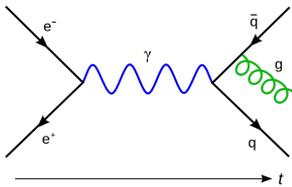


String theory

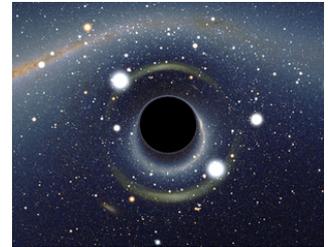


High-energy physics

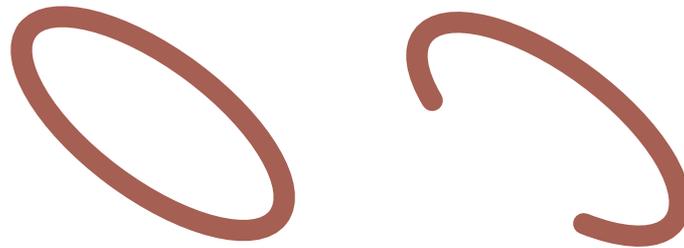
Quantum field theory



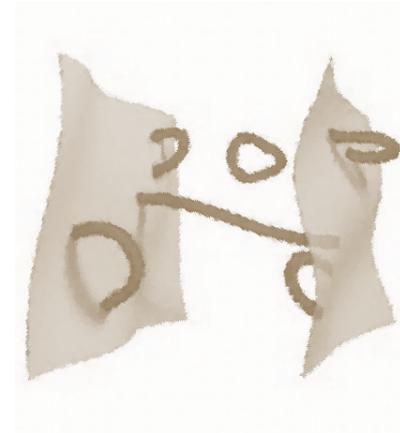
Gravity - General relativity



String theory



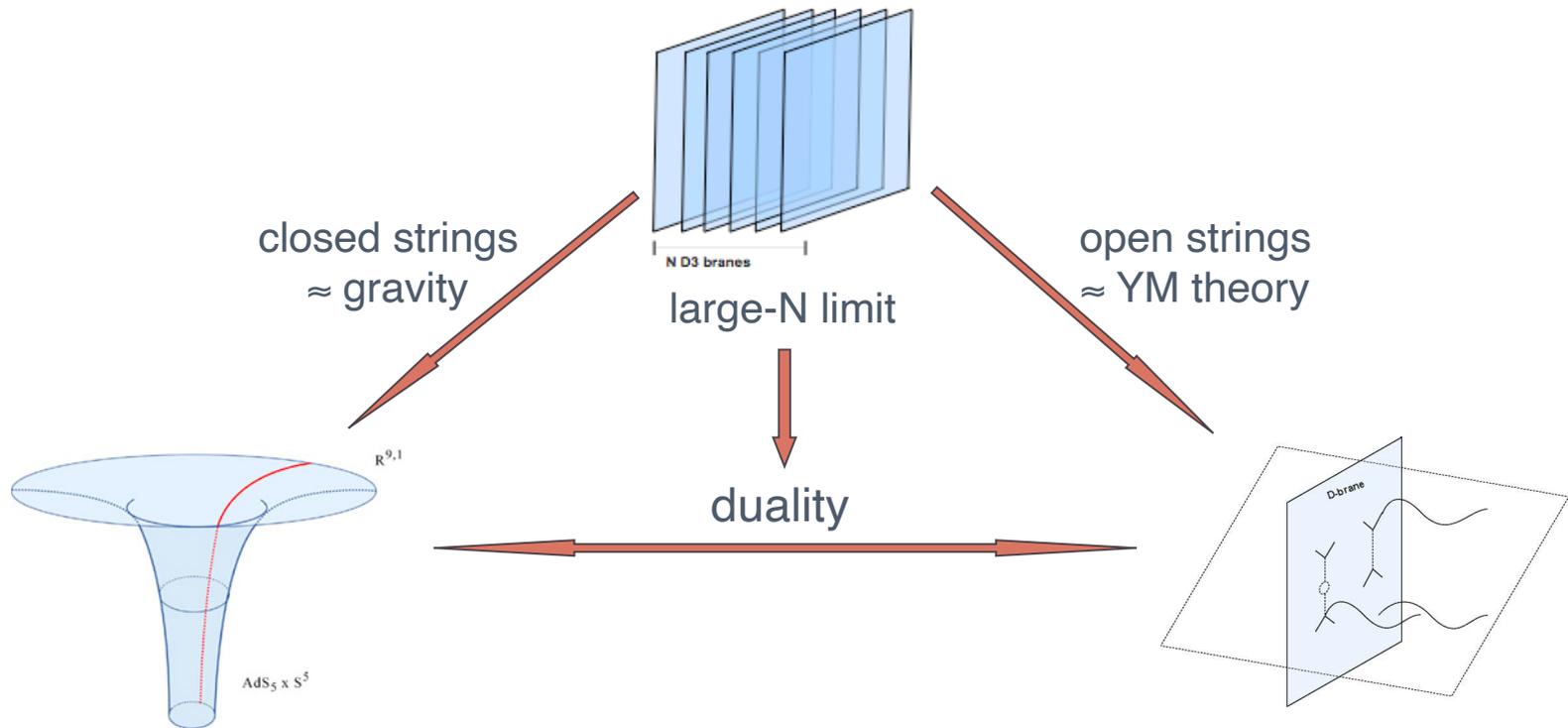
Dirichlet (D)-branes



AdS/CFT correspondence

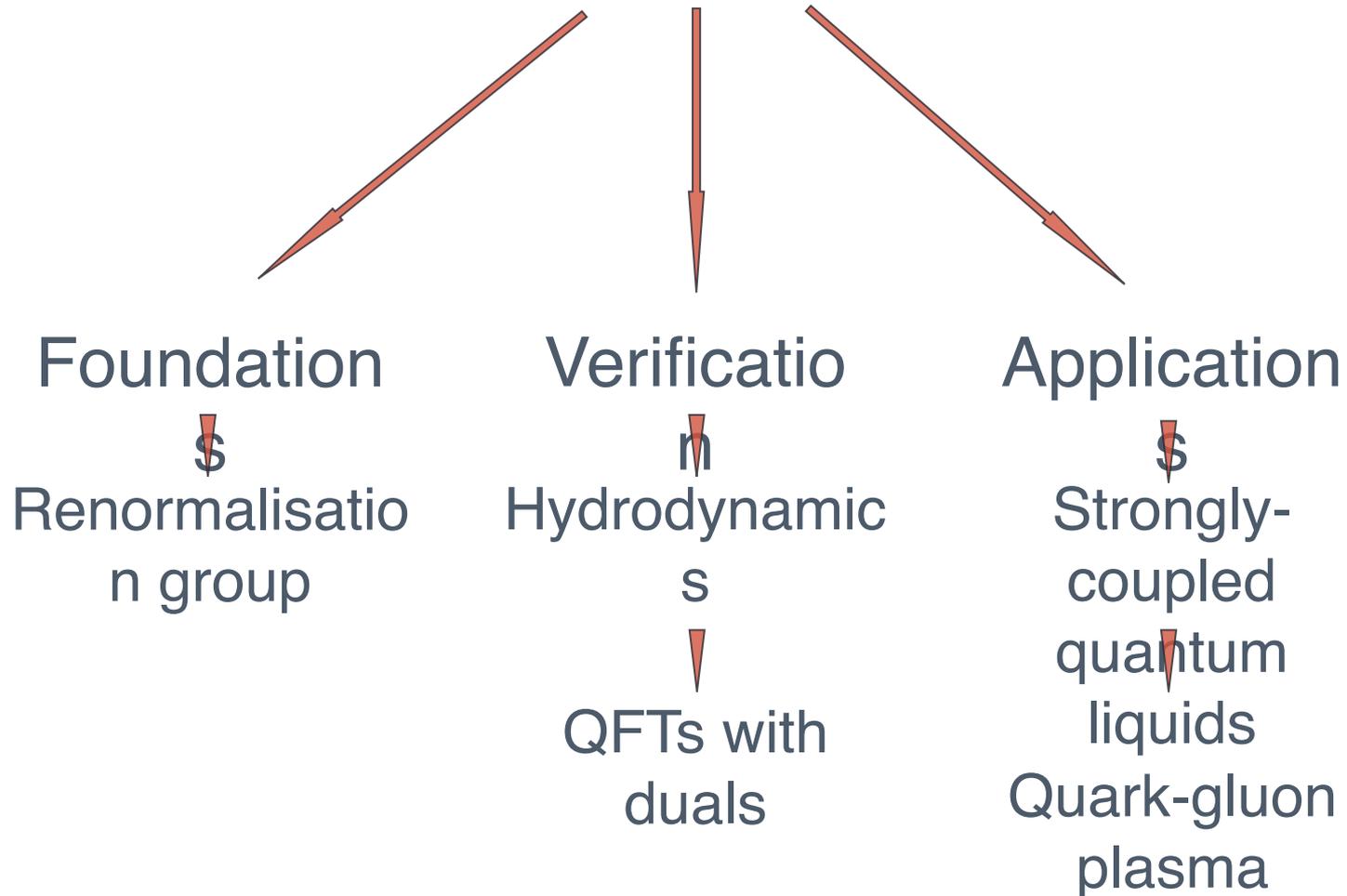
(Maldacena
'98)

Type IIB string theory on $AdS_5 \times S^5$ \longleftrightarrow $N=4$ U(N) super Yang-Mills theory in
D=4



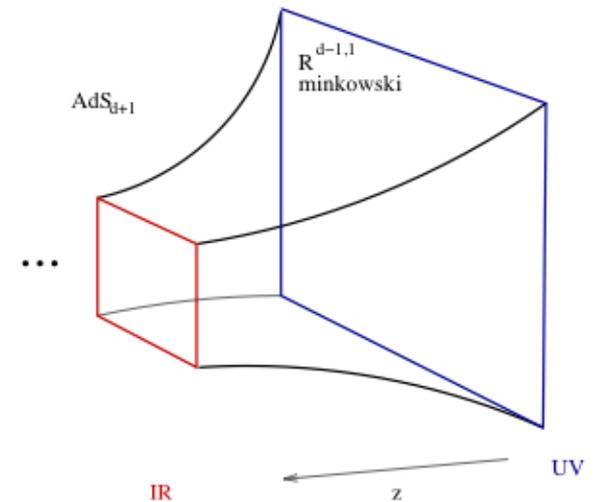
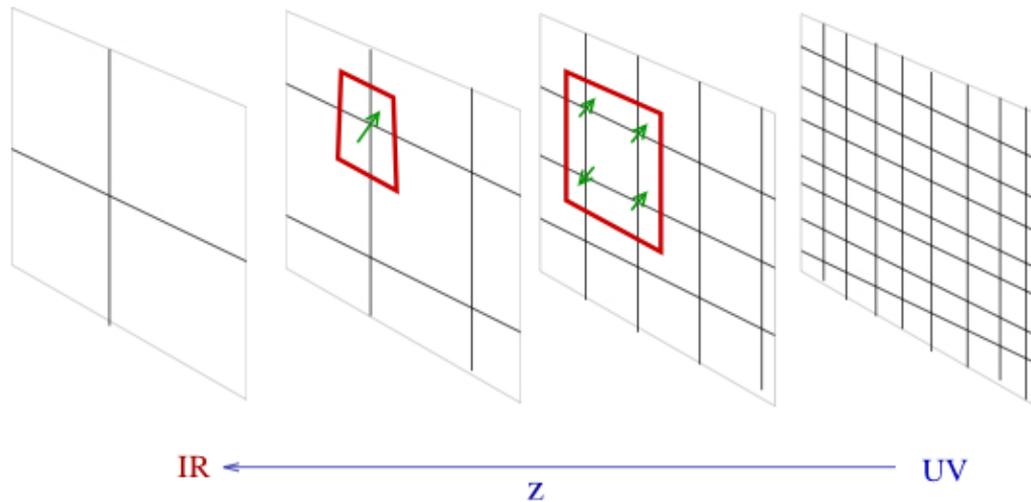
My work

Holographic duality



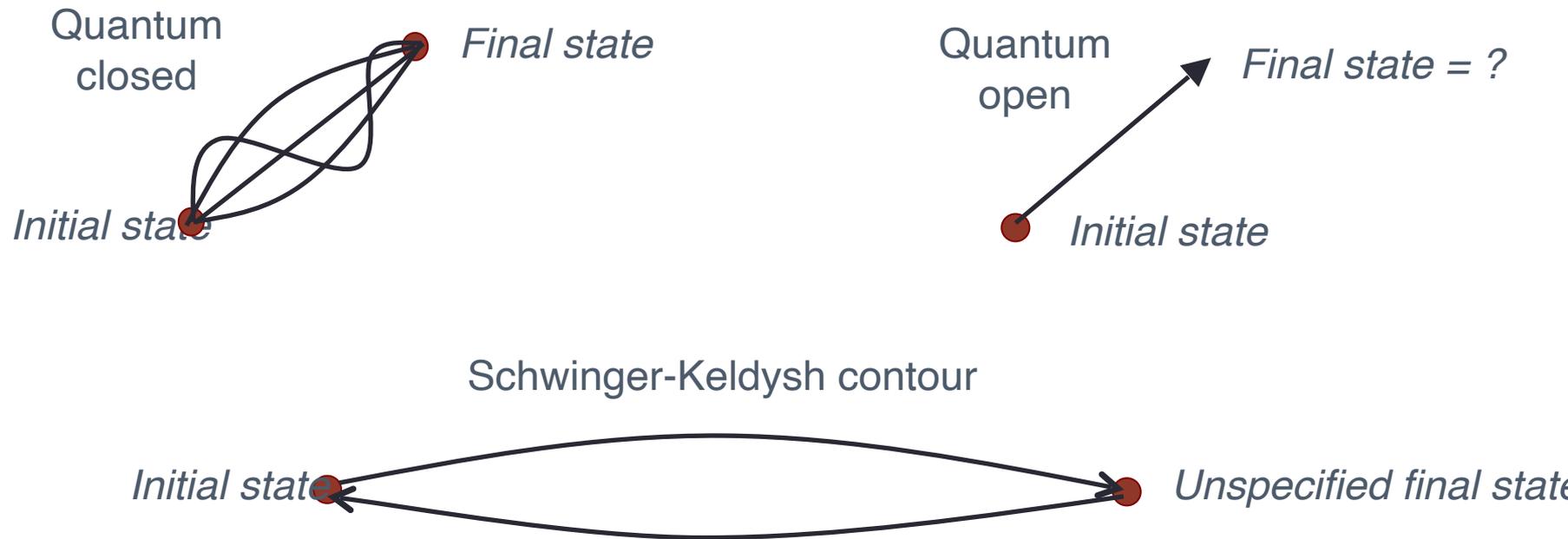
Wilsonian holographic renormalisation

- Renormalisation group
- Radial coordinate vs. energy scale



Quantum field theory and holography

- Dissipative hydrodynamics from effective field theory



- Supersymmetric theories with gravity duals at finite temperature and density

Applications of holography

- The electron star and quantum liquids with Lifshitz scaling
- Quark-gluon plasma

