

Title: PSI 2018/2019 - AdS/CFT - Lecture 6

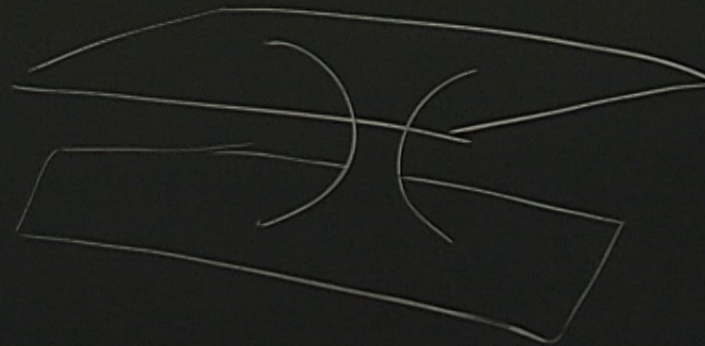
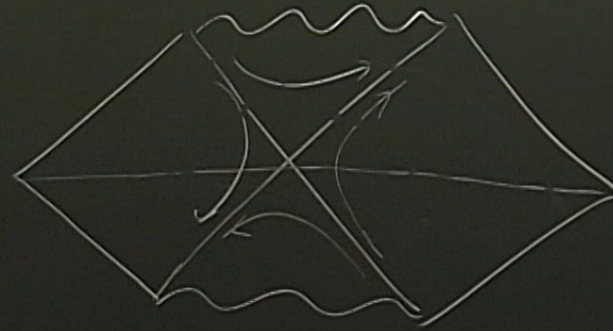
Speakers: Juan Maldacena

Collection: PSI 2018/2019 - AdS/CFT (Ali)

Date: April 23, 2019 - 10:15 AM

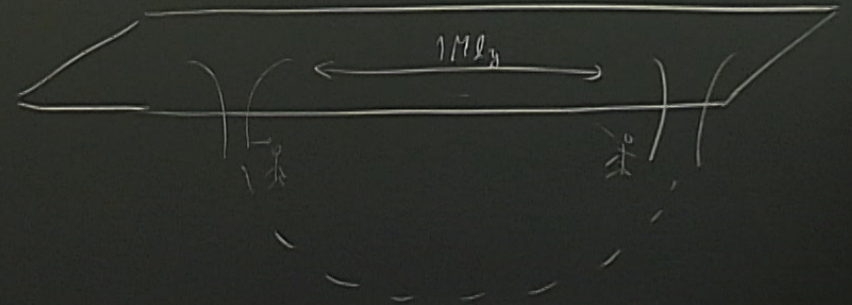
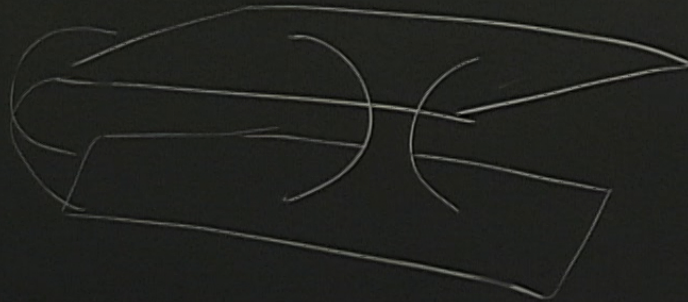
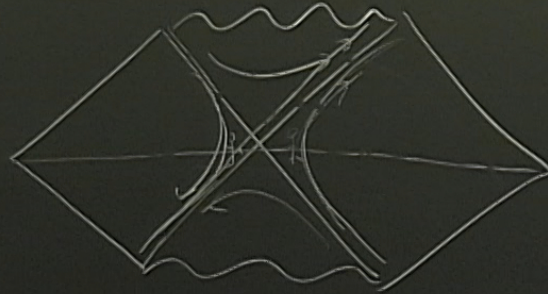
URL: <http://pirsa.org/19040130>

WORMHOLES & ENTANGLEMENT



S

MENT

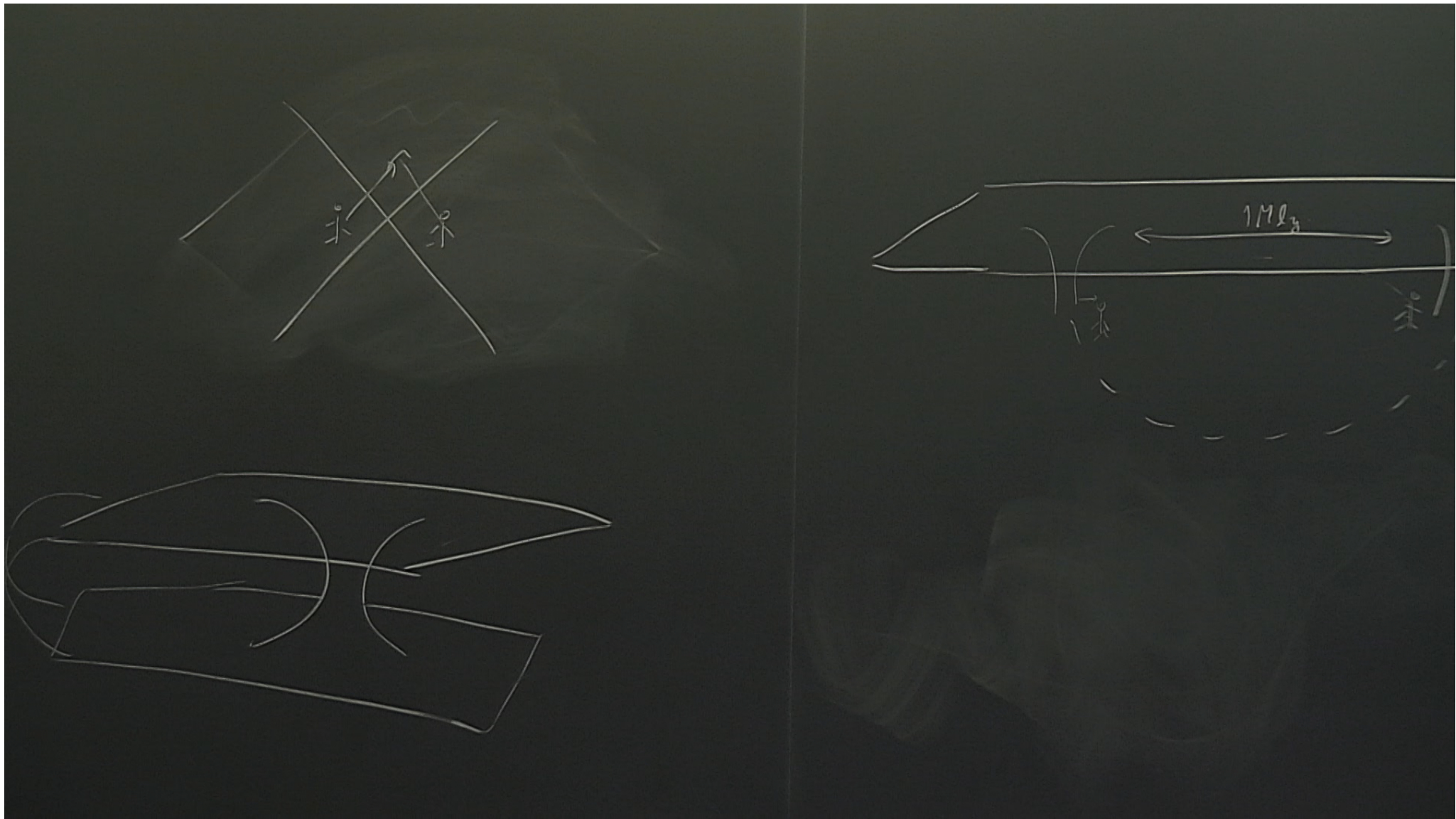


Th: No science fiction universe

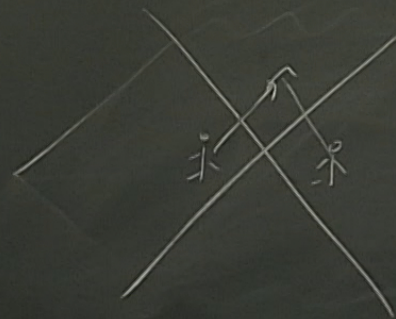
1) Einst eqn.

2) ANEC

$$\int_{-\infty}^{\infty} dx^+ T_{++} \geq 0 \quad \langle T_{++}^{(\lambda)} \rangle \text{ can be neg}$$



WORMHOLES & ENTANGLEMENT



ASSUMPTION

BH

$\approx$

Unitary QM
theory

$$S = \frac{A}{4G_N} \quad 9\text{-bits}$$

$$T = T_H$$

Th: No

1) Ein

2) A A

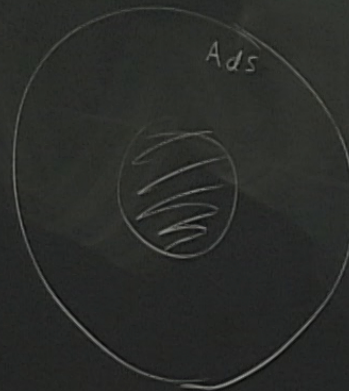
BH

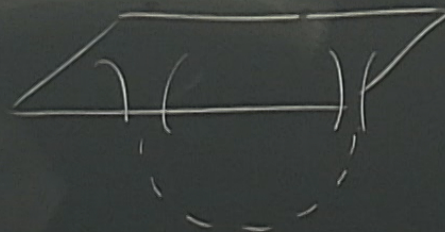
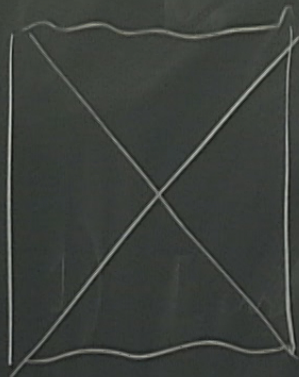
$\approx$

Unitary QM
theory

$$\sim S = \frac{A}{4G_N} \quad \text{q-bits}$$

$$T = T_H$$

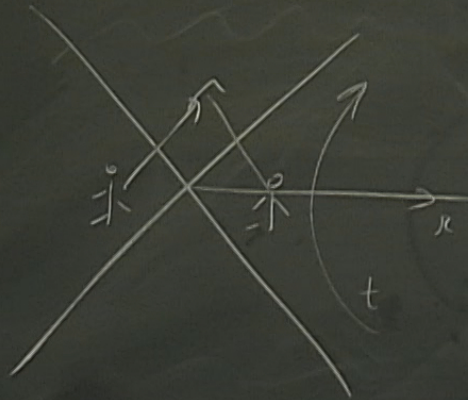




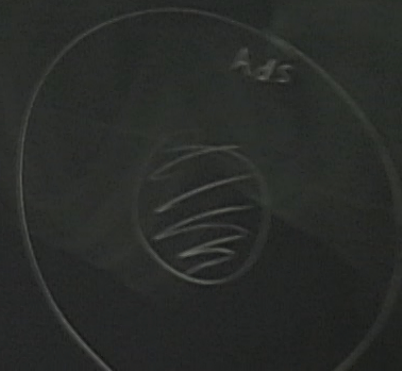
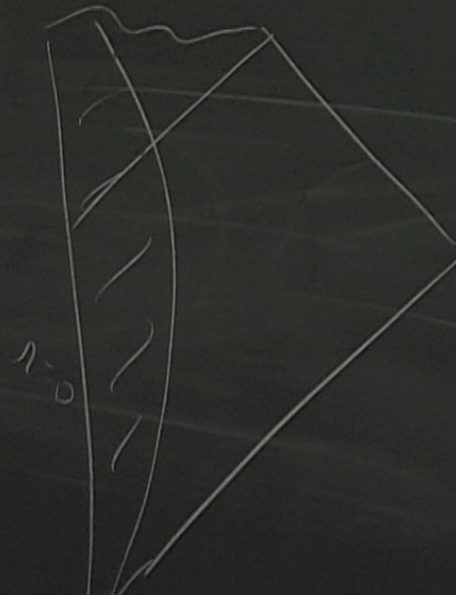
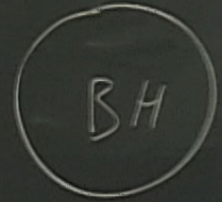
= 2 ENTANGLED
0 System

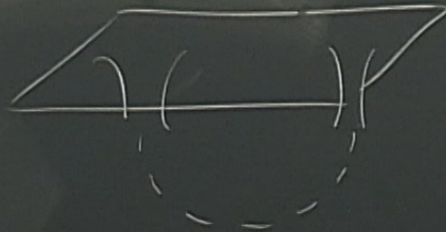
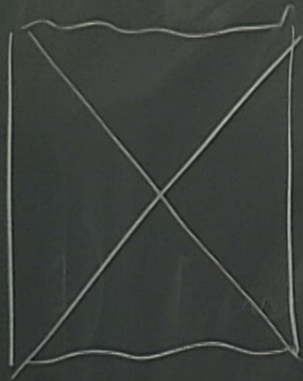
$$|TFD\rangle = \sum e^{-\beta E_n/2} |\bar{E}_n\rangle_L |E_n\rangle_R$$

ELEMENT



ASSUMPTION

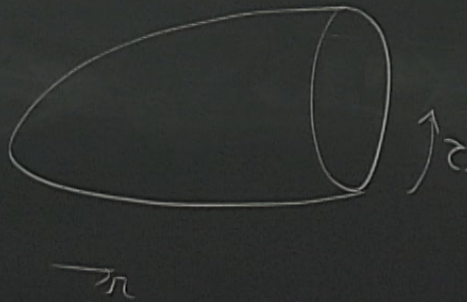




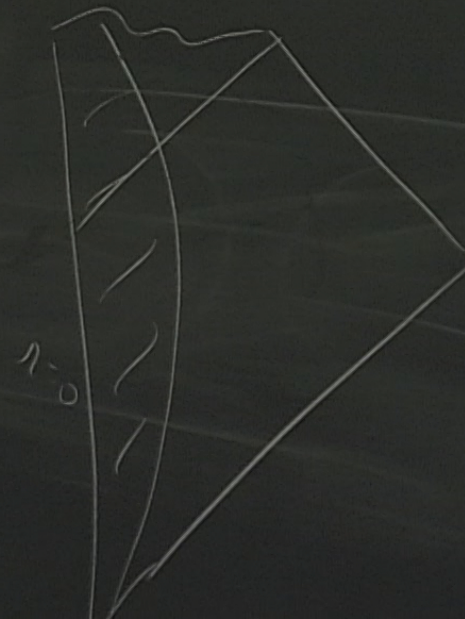
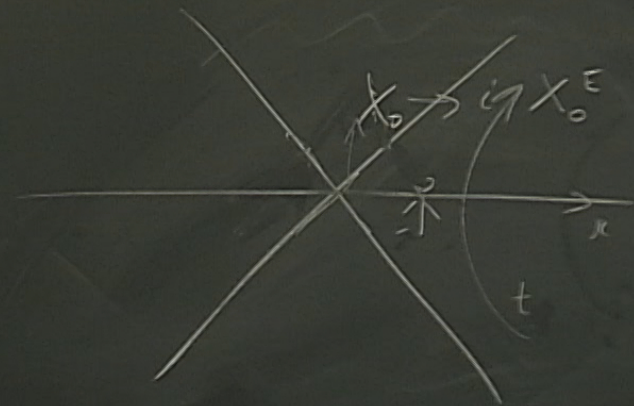
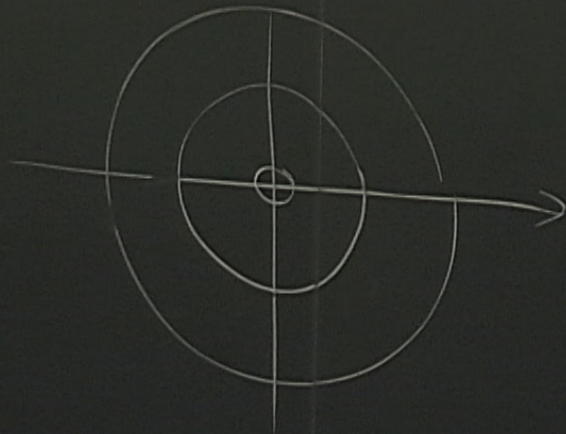
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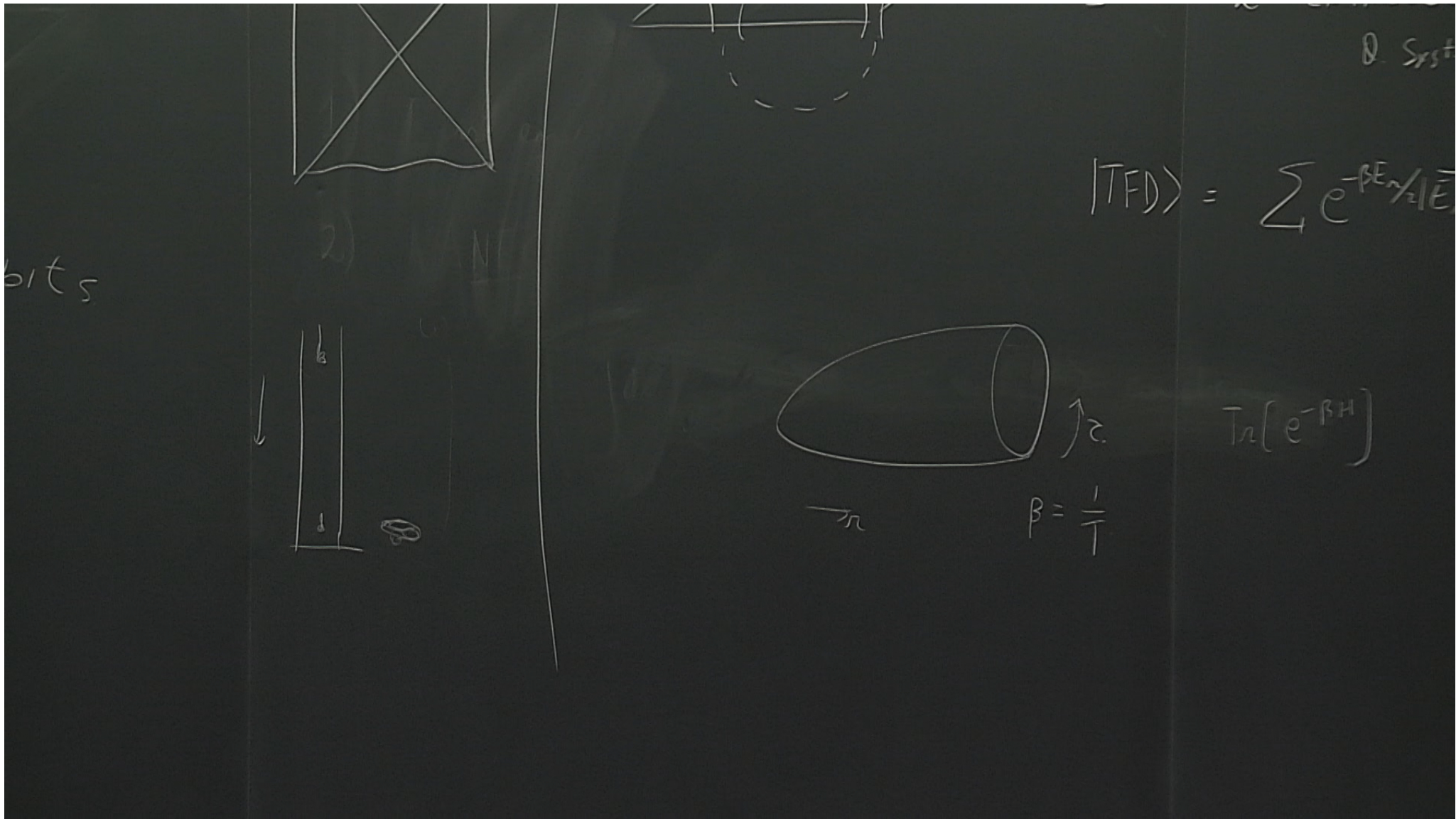
2 ENTANGLED
Q. Systems

$$|TFD\rangle = \sum e^{-\beta E_n/2} |\bar{E}_n\rangle_L |E_n\rangle_R$$



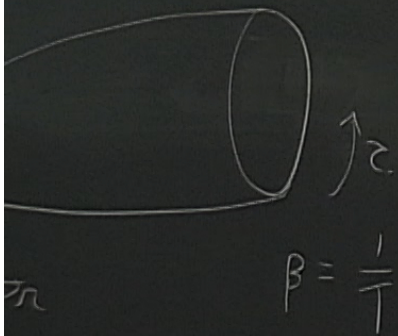
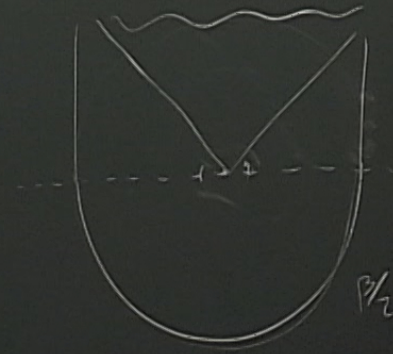
2 ENTANGLEMENT





= 2 ENTANGLED
Q. System

$$|TFD\rangle = \sum_L e^{-\beta E_L/2} |\bar{E}_L\rangle_L |E_L\rangle_R$$

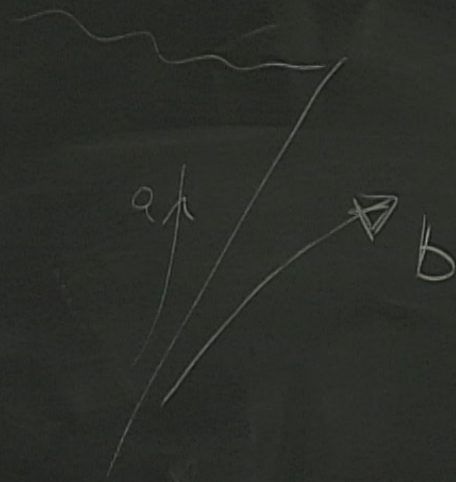


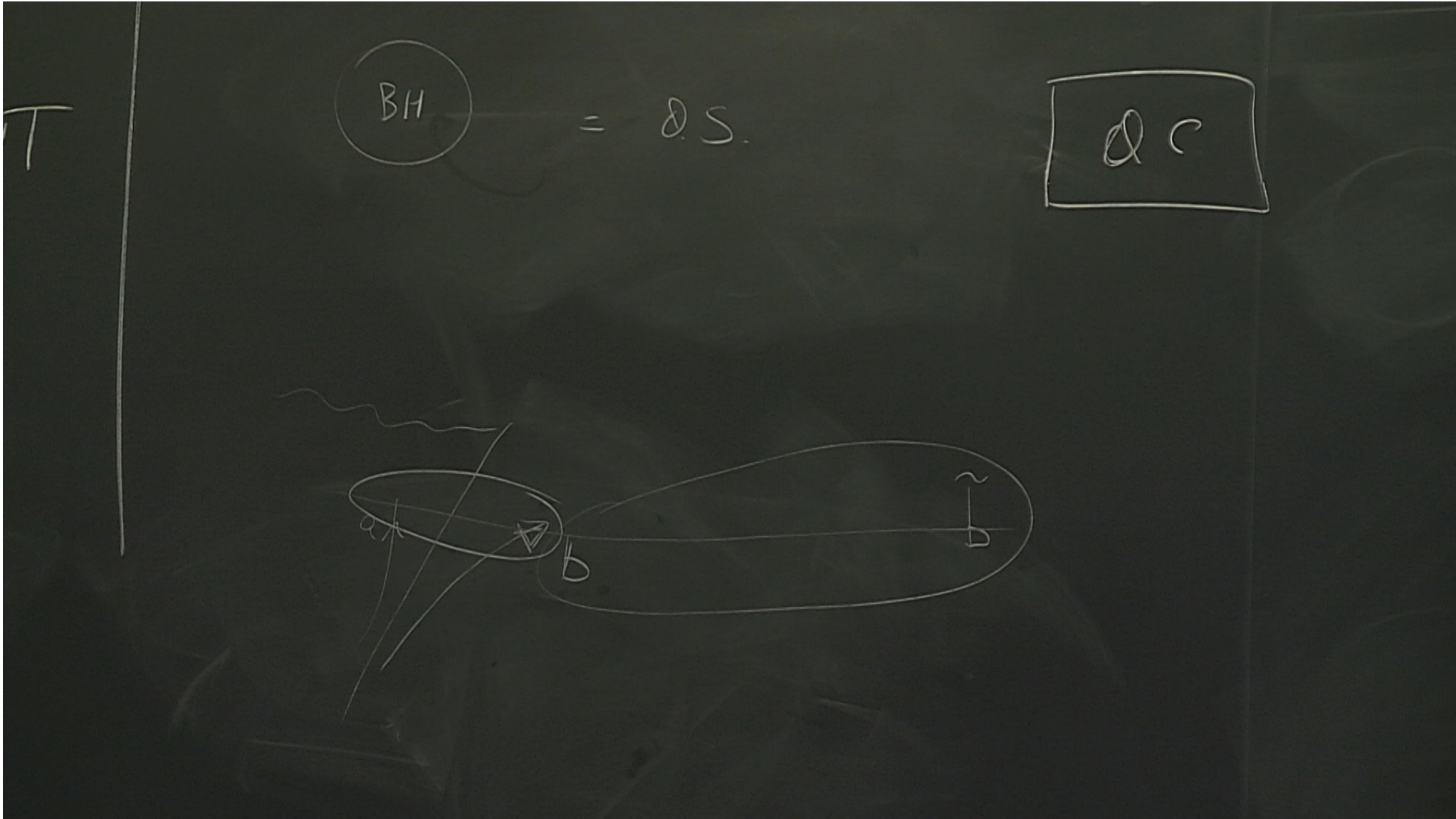
$$\text{Tr}[e^{-\beta H}]$$

BH

= ∂S

∂C





=

2 ENTANGLED

0. System

$$e^{-i\alpha B}$$

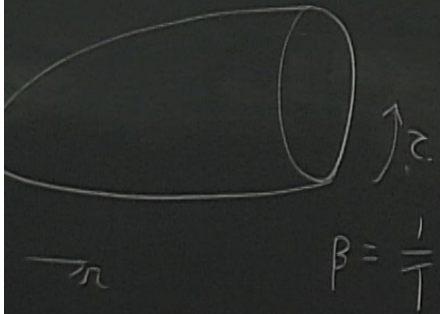
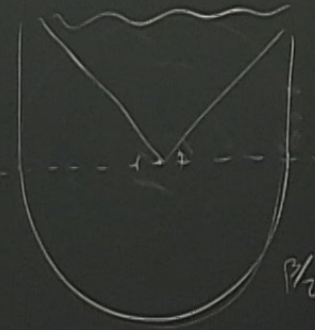
$$e^{-i(E_m)$$

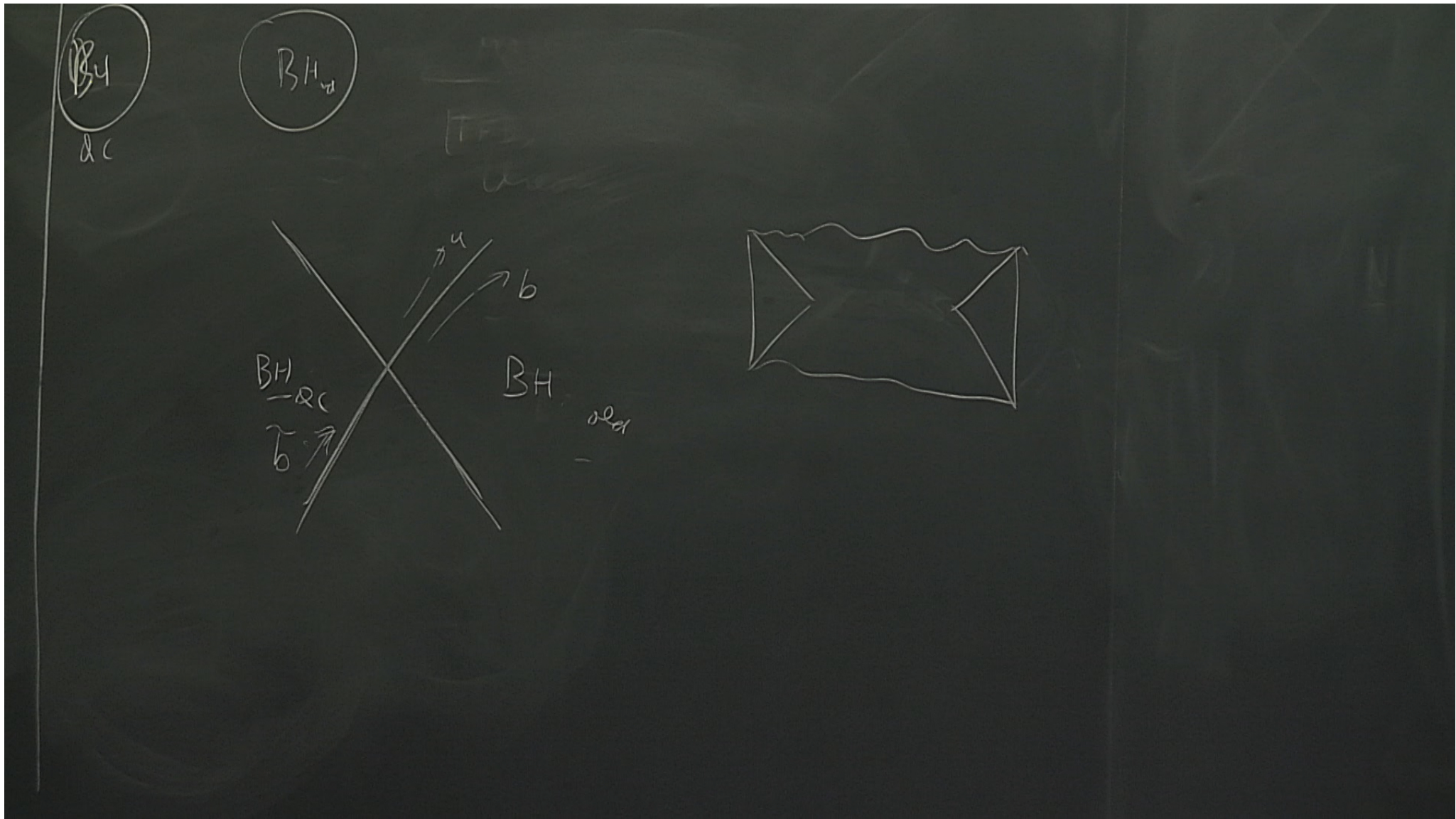
$$-E_m) \alpha$$

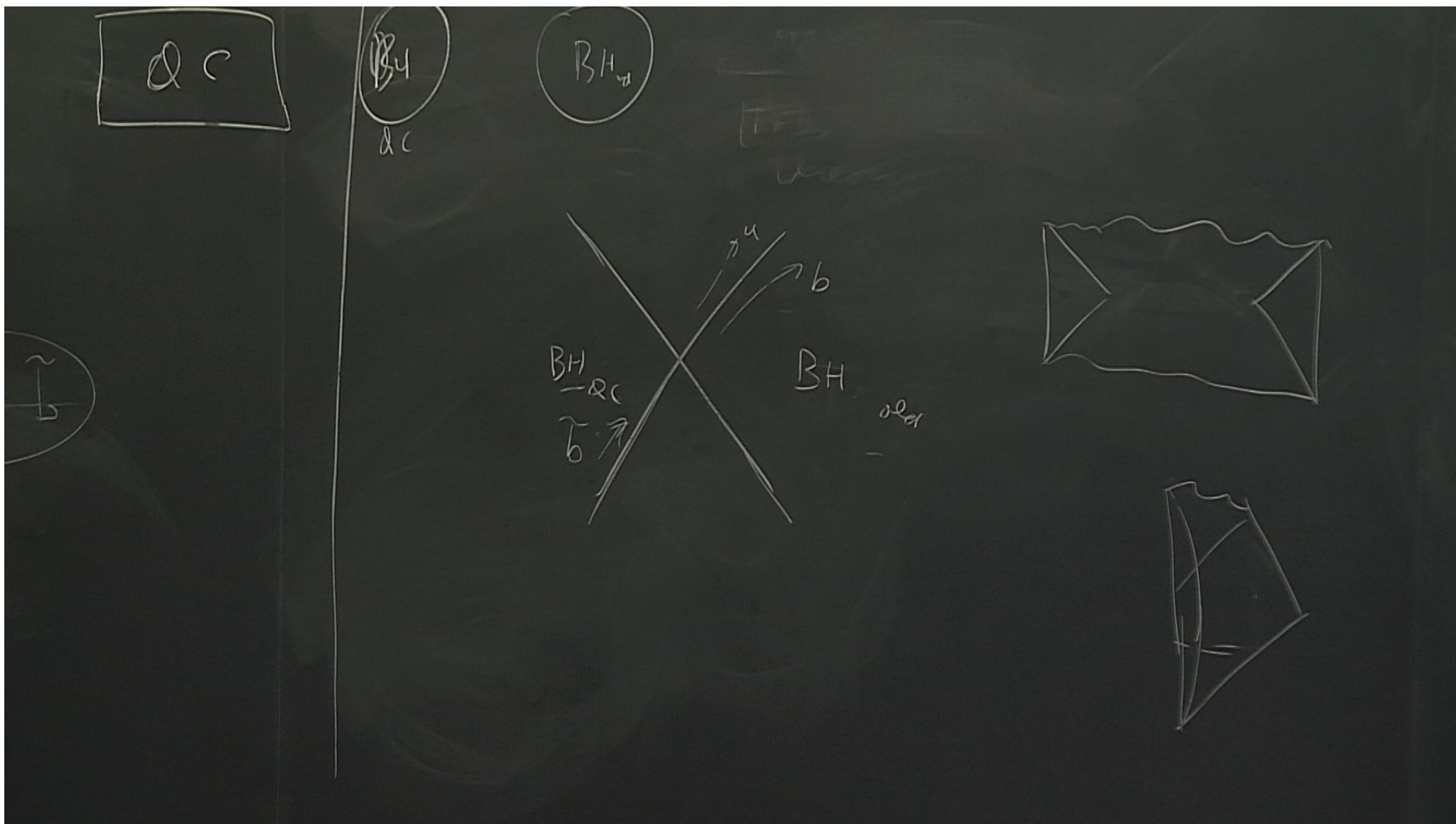
$$|TFD\rangle = \sum_L e^{-\beta E_m/2} |\bar{E}_m\rangle_L |E_m\rangle_R$$

$$H = H_L + H_R$$

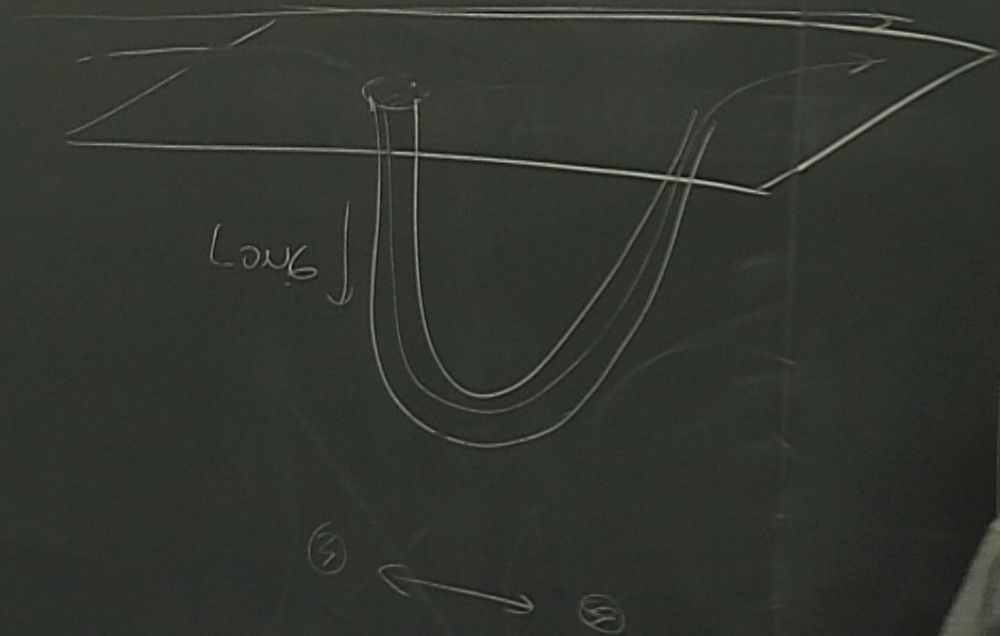
$$\text{Tr}[e^{-\beta H}] \quad B = -H_L + H_R$$



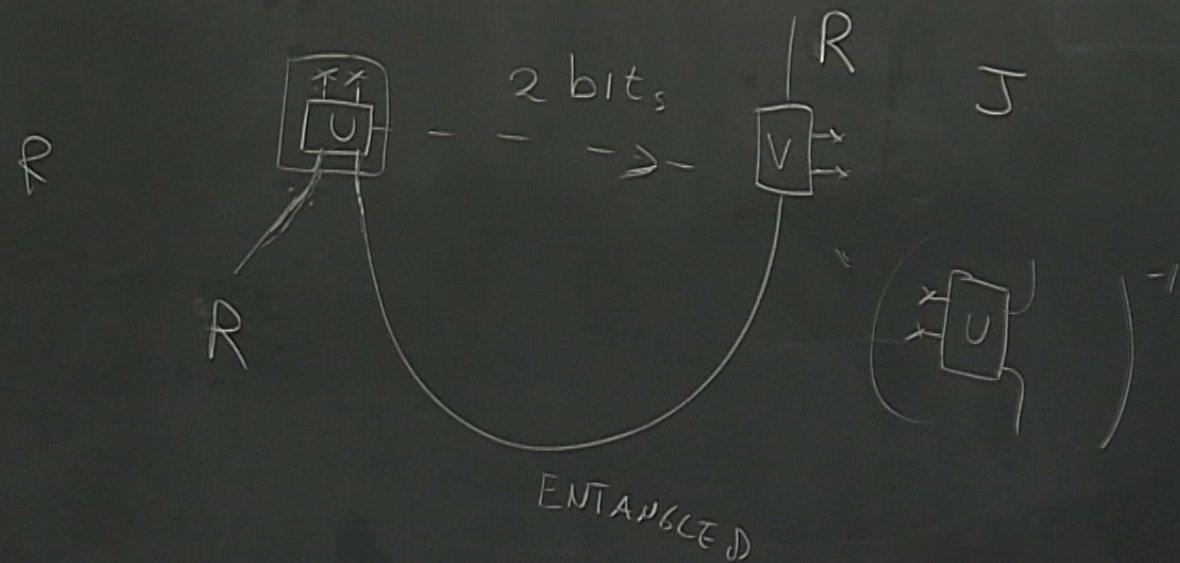




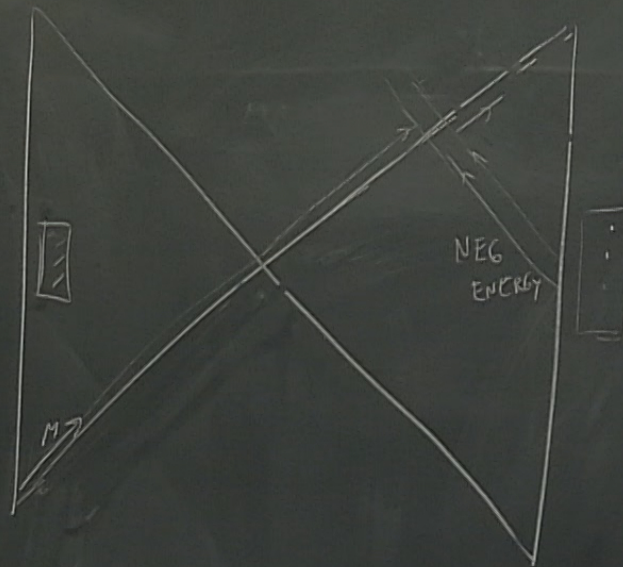
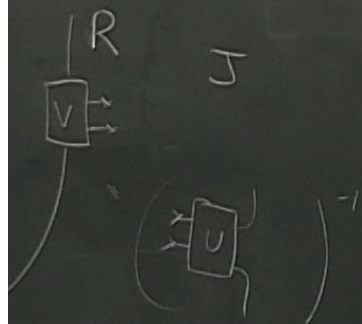
$$R_{++} = T_{++}$$



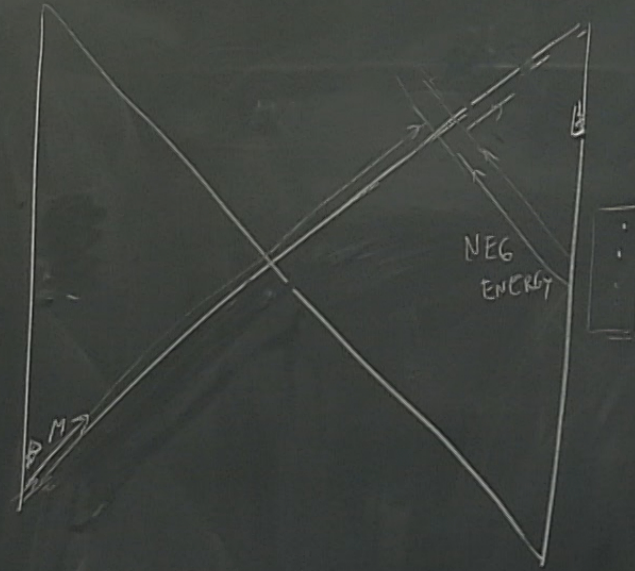
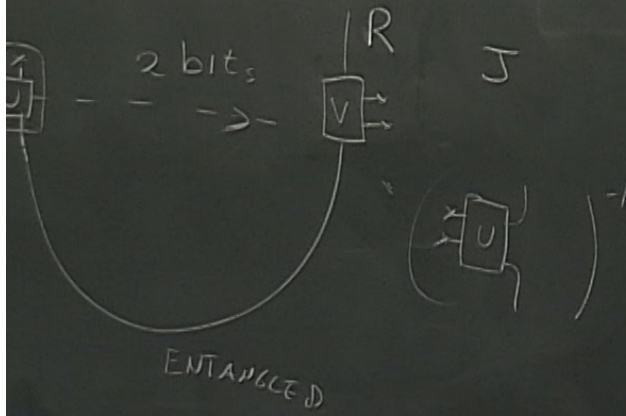
QUANTUM TELEPORTATION



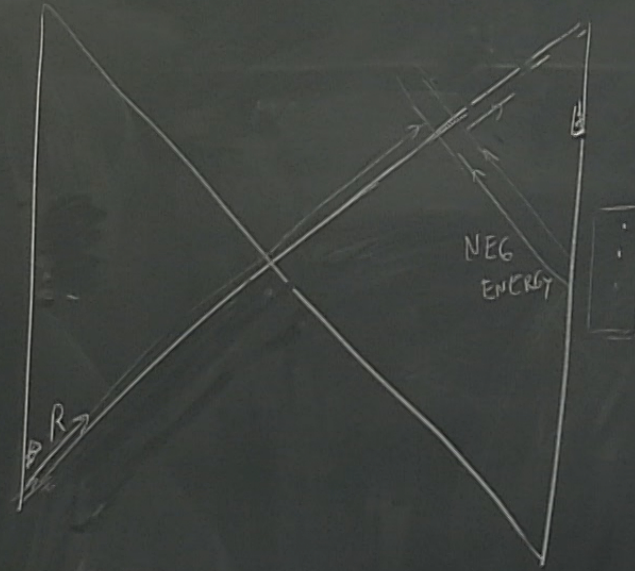
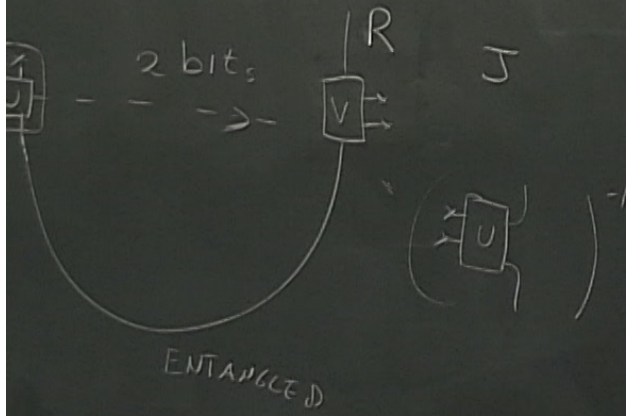
PORTATION



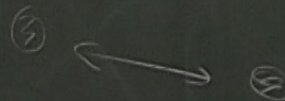
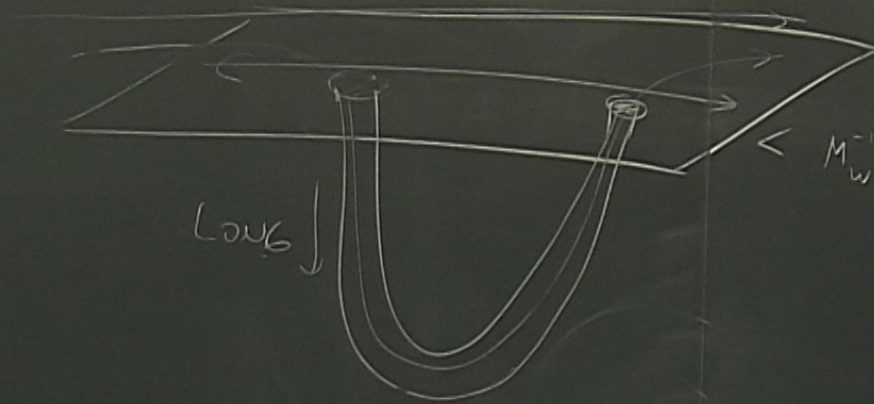
QM TELEPORTATION



QM TELEPORTATION



$$R_{++} = T_{++}$$



QUANTUM TE

