

Title: Firewall vs. Scrambling (Part 1)

Date: Feb 11, 2019 01:00 PM

URL: <http://pirsa.org/19020074>

Abstract: <p>Recently I pointed out that reconstruction of interior operators can be interpreted as the Hayden-Preskill recovery. Building on this observation, I will propose a resolution of the firewall puzzle by describing a state-independent reconstruction of interior operators which does not lead to the non-local signaling. </p>

Firewall vs. Screening

1. Firewall argument

outside (hub)



$D \wedge B \wedge (R) \Rightarrow K(IID)$
Have random H_{res}
 $I(D, P) \geq \max I(D, C) = 0$

Inside (wire)



$I(D, B) \geq \max$
 $I(D, P) \geq 0 \Rightarrow \text{Final}$
 $I(P) \leftarrow I(P) - \gamma \alpha$

$$A = P \cup (B \cup R) \quad FR = EPR$$

B : not in C , in CUR

Non-local signaling \geq Fault-tolerance

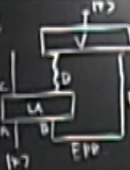


State-dependence

construction of B depends on R
bivariate, Factor theorem, ...
Final state proposal

2. Hybrid-Protocol

Set up

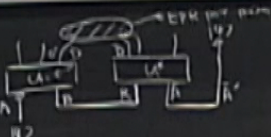


A: input
B: initial BH
C: query
D: late
E: during BH
F: during BH

$I(D, B) \geq \max$
 $I(D, P) \geq 0 \Rightarrow \text{Final}$
 $I(P) \leftarrow I(P) - \gamma \alpha$

$$\langle Q_1(n) Q_2(n) Q_3(n) Q_4(n) \rangle \neq \text{simple } V$$

$UB \wedge V \rightarrow \text{delay}$



$I(D, B) \geq \max$
 $I(D, P) \geq 0 \Rightarrow \text{Final}$
 $I(P) \leftarrow I(P) - \gamma \alpha$

Closing Protocol

$$14 \rightarrow 142014$$

as $h_2 = h_1 \cdot \gamma \alpha$
- (complexity)
- Backreaction

3. Reconstruction



D: output
E: during BH
F: during BH

$$R = A \cup B$$



H: input
A: construction
B: construction
C: construction
D: construction
E: construction
F: construction

B : in C and A (input)
above: made C
Fault-tolerance
 $n = \gamma$