Is Reality An Error Correcting Code?

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Rutgers University, WINLAB
S. James Gates
University of Maryland

February 2013

MODEST PHYSICIST

Credit Where Credit Is Due

(even more) MODEST STRING THEORIST

Or to Some ...

Communication Theorist

Popular Culture Doesn’t Help

Tricia Rose

Stephanie Bell-Rose

S. James Gates

Can’t Beat ’Em?

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DEMYSTIFY ’EM!

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(show physics looks just like comm theory)

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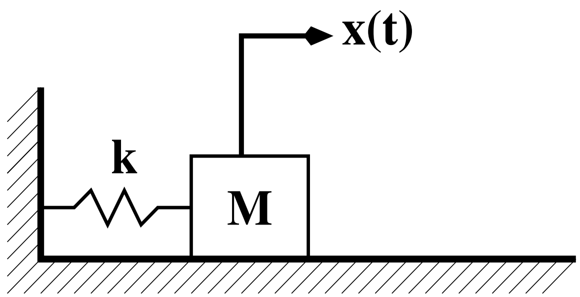
It’s All About Energy (classical)



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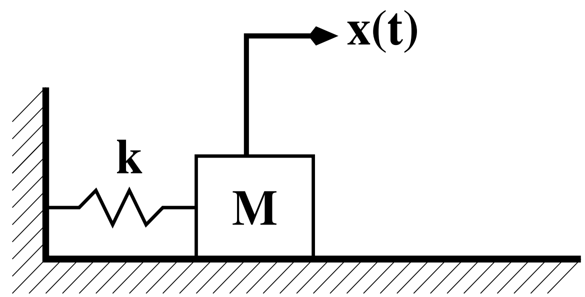

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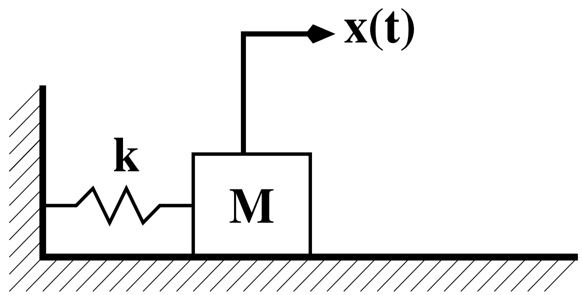

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$$\dot{x} = \frac{\partial H()}{\partial p} \quad \dot{p} = -\frac{\partial H()}{\partial x}$$

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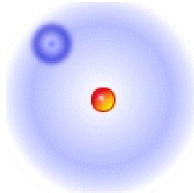

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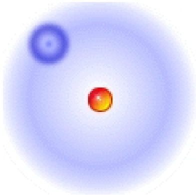

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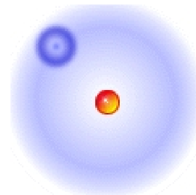

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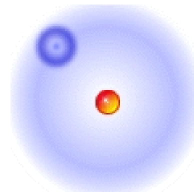

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- Schrödinger:

$$i\hbar\frac{\partial\psi}{\partial t} = \mathcal{H}\psi$$

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- In general (system of particles) $\int |\psi(\mathbf{r}_1 \cdots \mathbf{r}_N, t)|^2 \, d\mathbf{r}_1 \cdots d\mathbf{r}_N dt = 1$

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NOT So Mysterious, Huh?

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- **Composites**:
  - Schizophrenic, but ...
  - **STILL** either integer or half-integer spin

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- Nature can always tell if you peeked
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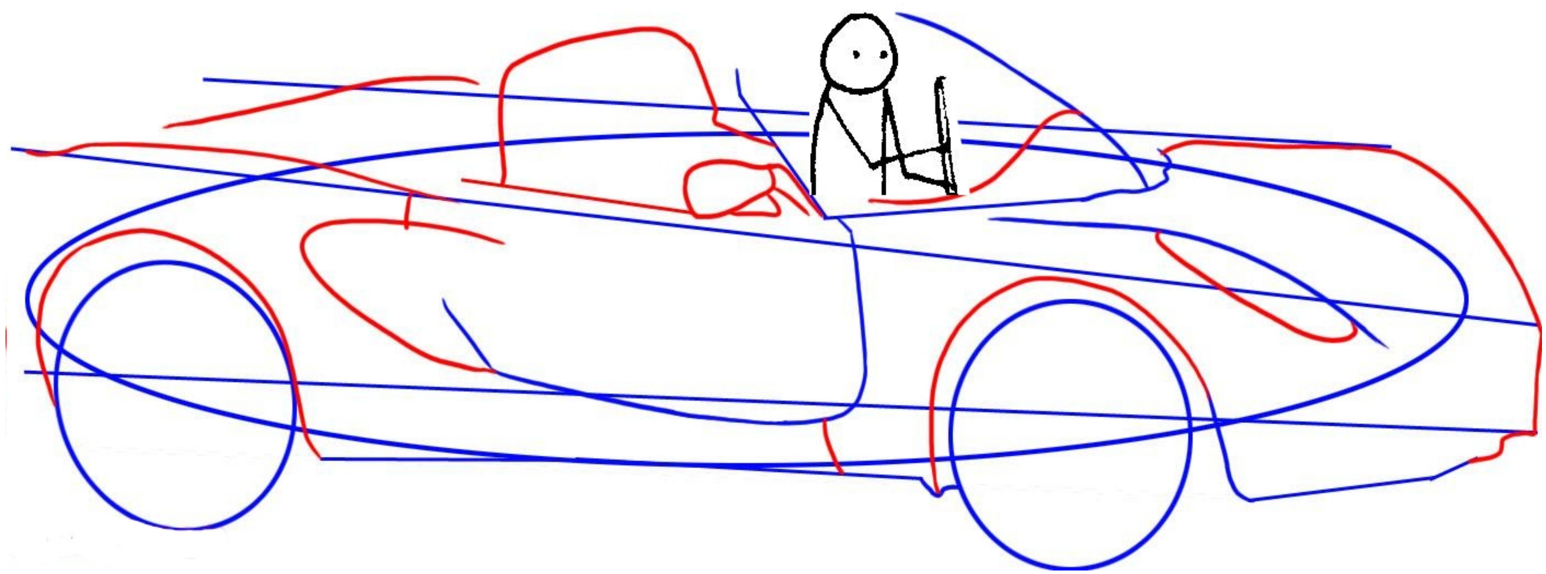
SuperSymmetry helps

SuperSymmetry Disclaimer



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The $\{Q_i\}$ are sorta like dimensions

(but not really)

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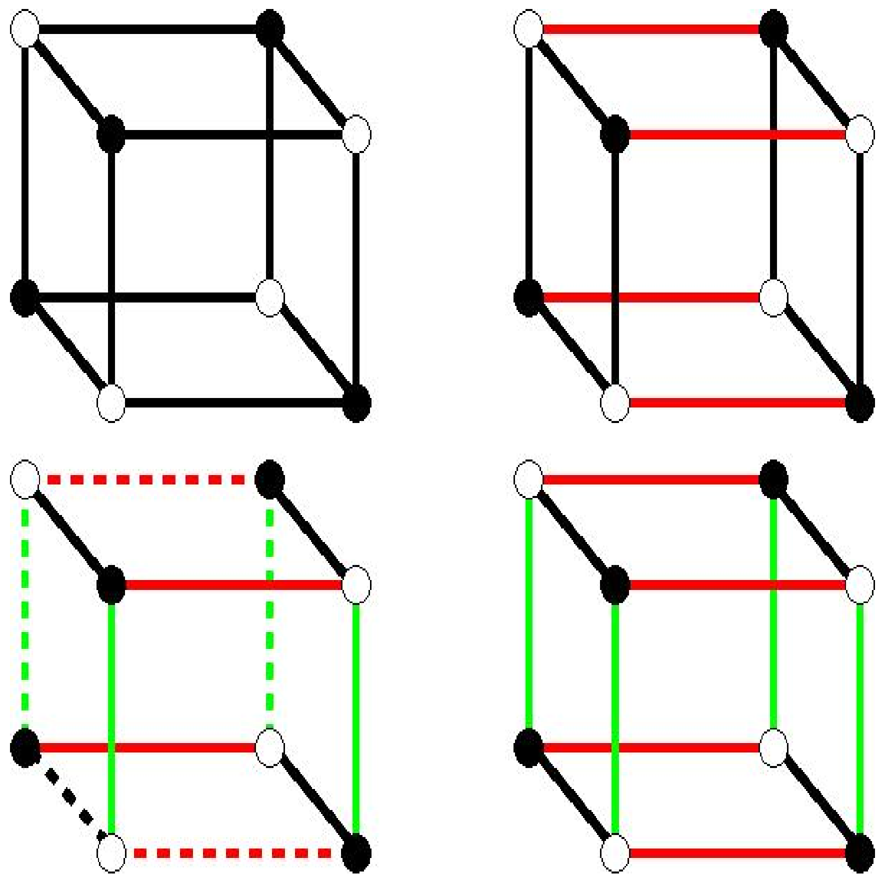
Many Different Possible Graphs (systems)

Construction Illustration



Adinkras and Fields of Particles

- Nodes can be rearranged according to “engineering dimension”
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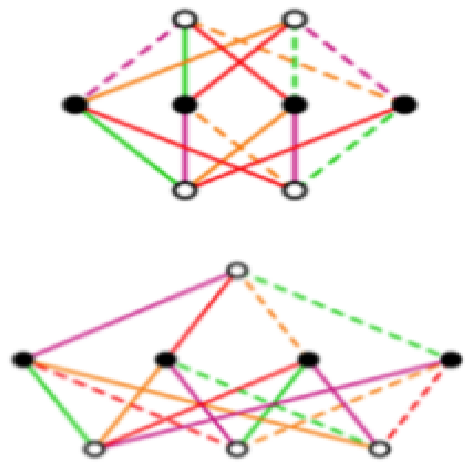

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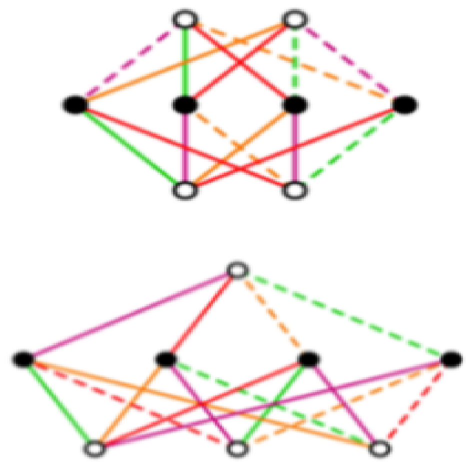

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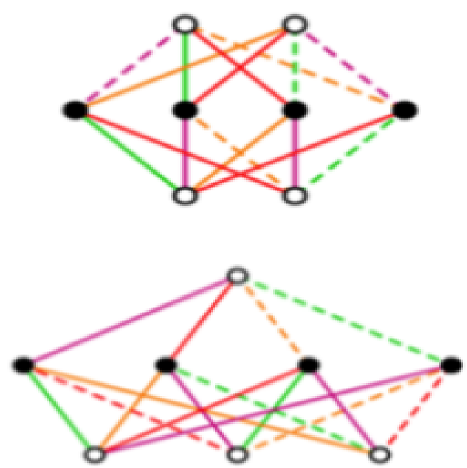

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EXACT Representations of Potential Realities

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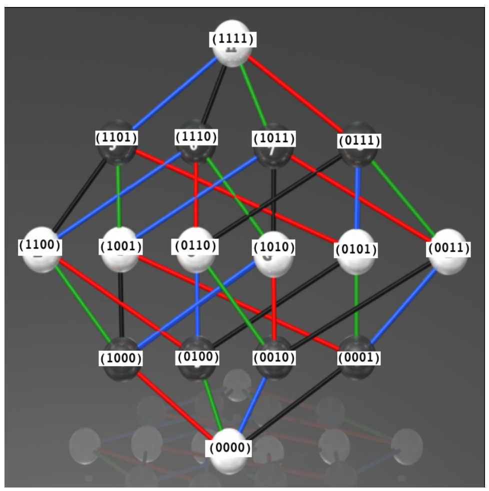
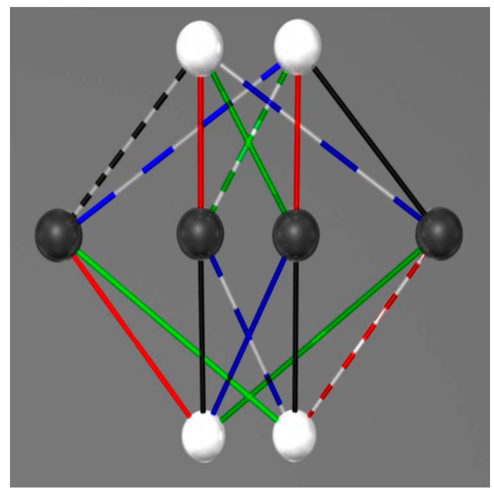


$\Rightarrow$



(link to video)

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LBC Controls Adinkras Folding!

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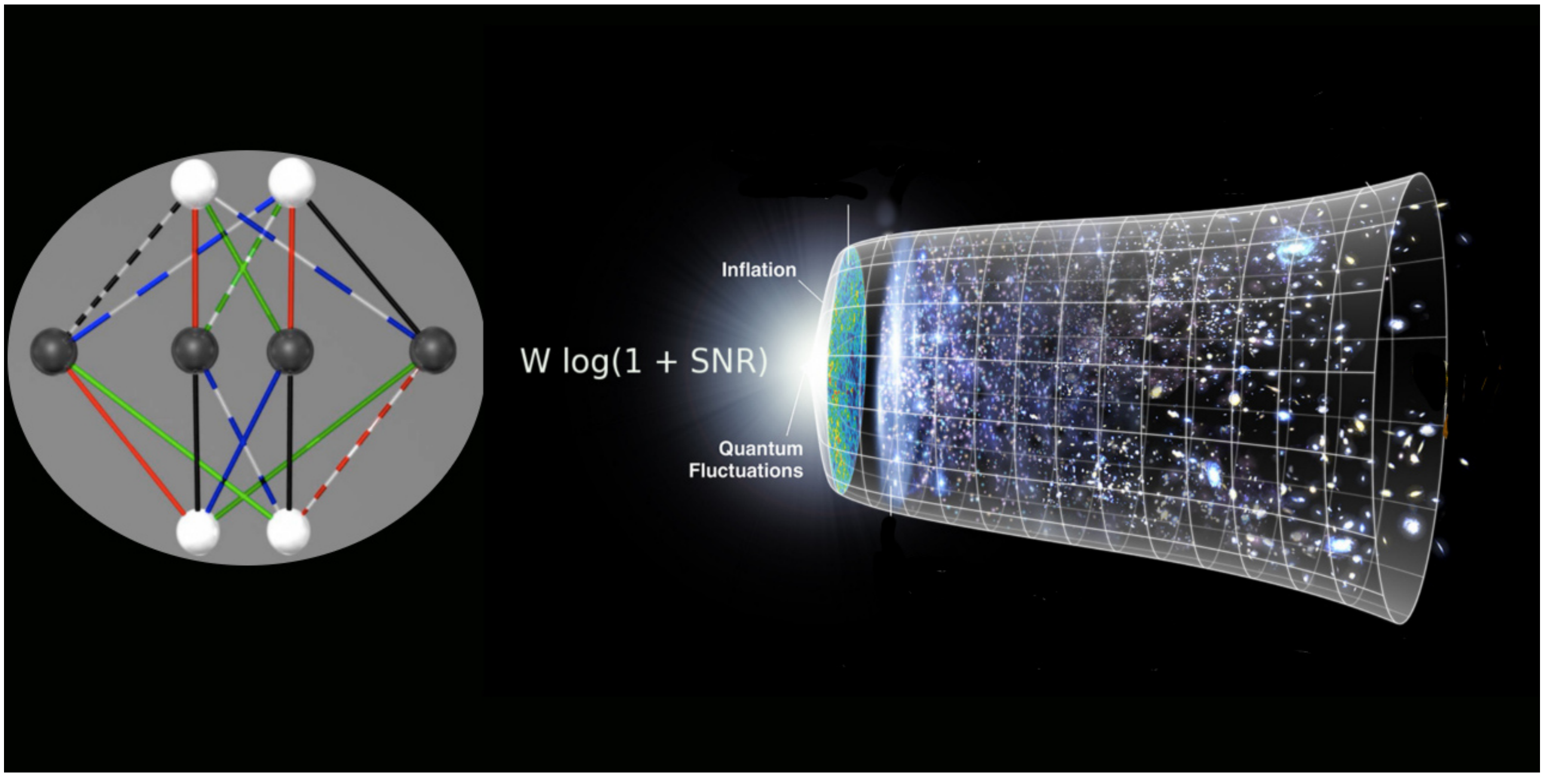
What Do I Hope It Means?

Structure of Reality $\Leftrightarrow$ BEC Codes



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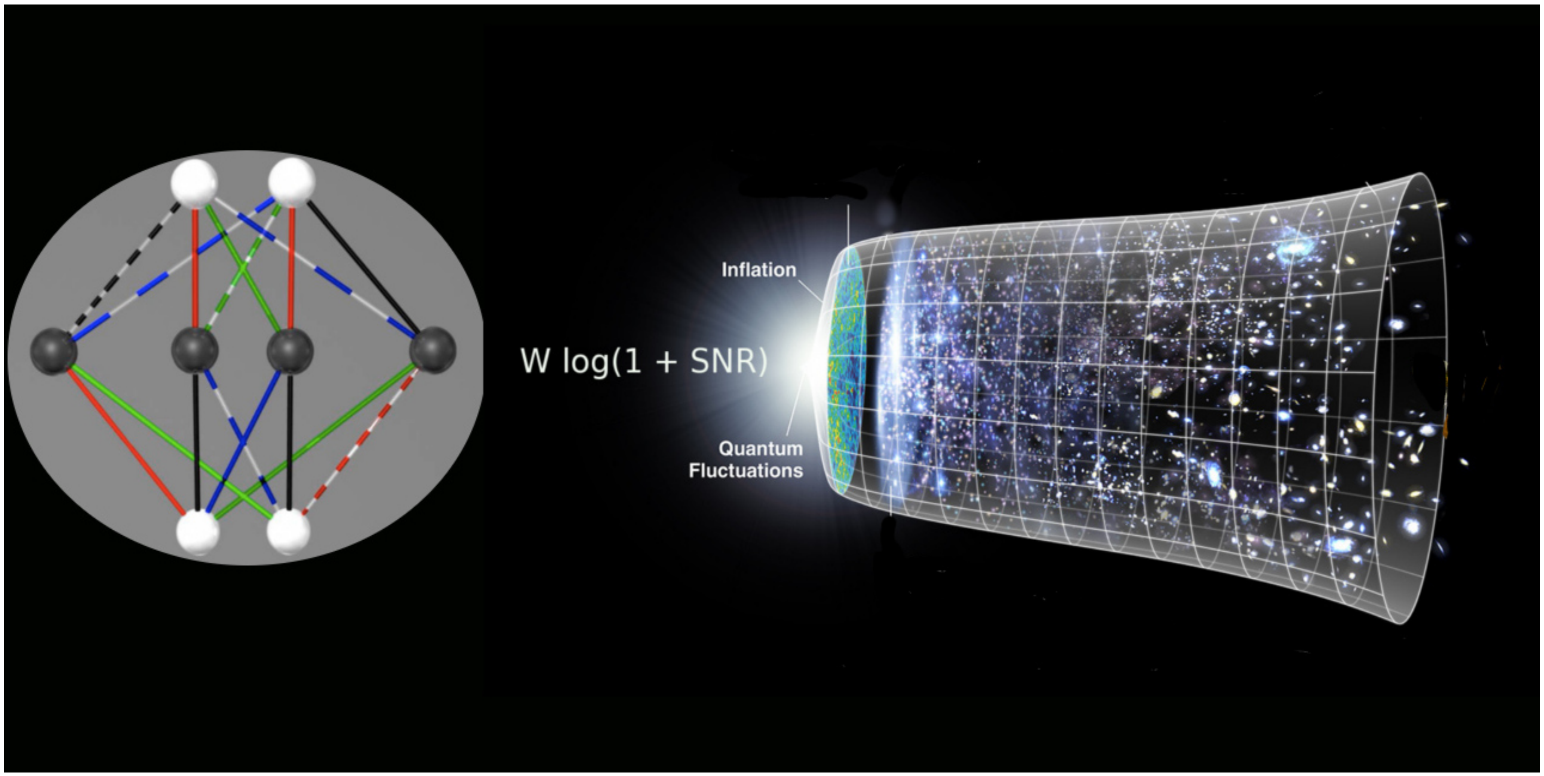

Communication Theory PWNS EVERYTHING!