Title: Condensed Matter Review-14

Date: Feb 12, 2015 09:00 AM

URL: http://pirsa.org/15020011

Abstract:

$\bar{\rho} = \sum_n |a_n|^2 \Pi_n$ Compl. dephased state diagonal ensemble $= \frac{1}{T}\int_0^T \rho(t)\,dt$

initial popul $\quad |E_n\rangle\langle E_n|$

$\lambda_n = -\log |a_n|^2$ $\quad T$ large

$\bar{\rho} = e^{-\sum_n \lambda_n \Pi_n}$

GGE

If there is a typical value $\bar{A}$ for $\langle A(t)\rangle$

then $\bar{A} = \mathrm{Tr}[\hat{A}\bar{\rho}] = \sum_n |a_n|^2 A_{nn}$

$H = \sum_n E_n \Pi_n$

Typicality

$$| \mathrm{Tr}\, \hat{A} \, (\rho(t) - \bar{\rho}) | \quad \text{small}$$

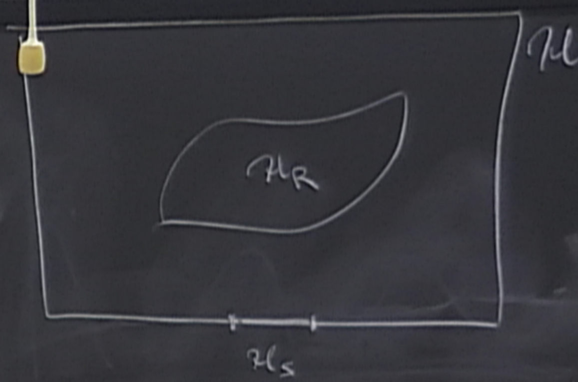
$$D [\mathrm{Tr}_E \, \rho(t) , \mathrm{Tr}_E \, \bar{\rho}] \quad \text{small}$$

$$\Omega := \frac{\mathbb{1}_R}{d_R} \qquad \Omega_s = \mathrm{Tr}_E \frac{\mathbb{1}_R}{d_R}$$

canonical state on $\mathcal{H}_R$ $\qquad \dim \mathcal{H}_R = d_R$

$\mathcal{H} = \mathcal{H}_S \otimes \mathcal{H}_E$

$\mathcal{H}_R \subseteq \mathcal{H}$



Theorem 1

Pick a "random" state ϕ in $\mathcal{H}_R$.

$$\Pr \left(D (\phi_s , \Omega_s) \geq \eta \right)$$

Typicality

$|\,\mathrm{Tr}\,\hat{A}\,(\rho(t) - \bar{\rho})\,|$ small

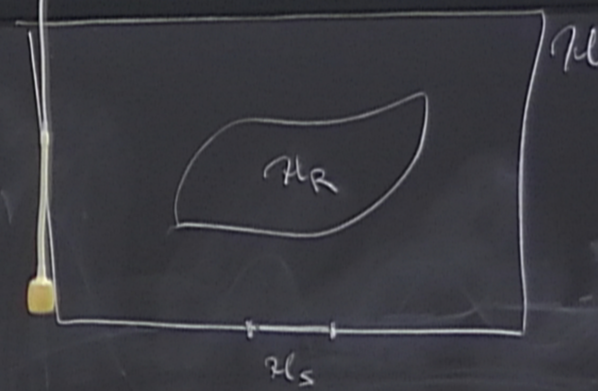
$D\left[\mathrm{Tr}_E\,\rho(t),\ \mathrm{Tr}_E\,\bar{\rho}\right]$ small

$:= \dfrac{\mathbb{1}_R}{d_R}$ $\Omega_\phi = \mathrm{Tr}_E \dfrac{\mathbb{1}_R}{d_R}$

...nical ...ate on $\mathcal{H}_R$ $\dim \mathcal{H}_R = d_R$

$\mathcal{H} = \mathcal{H}_S \otimes \mathcal{H}_E$

$\mathcal{H}_R \subseteq \mathcal{H}$



Theorem 1

Pick a "random" state ϕ in $\mathcal{H}_R$.

$$\Pr\left(D(\phi_S, \Omega_S) \geq \eta\right) \qquad \eta = \epsilon + \frac{1}{2}\sqrt{\frac{d_S}{d_E}}$$

$$|\psi_S^i\rangle \otimes |\psi_E^i\rangle$$

Typicality

$|\mathrm{Tr}\,\hat{A}\,(\rho(t) - \bar{\rho})|$ small

$D[\mathrm{Tr}_E\,\rho(t), \mathrm{Tr}_E\,\bar{\rho}]$ small

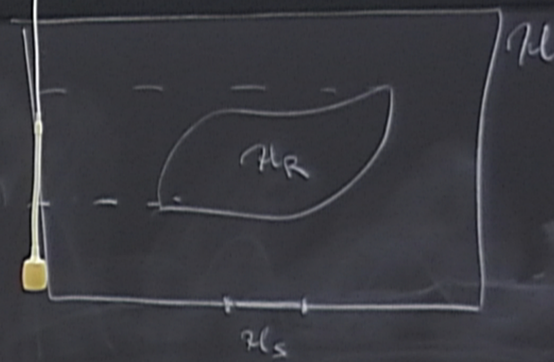
$\Omega_R := \frac{\mathbb{1}_R}{d_R}$ $\qquad \Omega_S = \mathrm{Tr}_E \frac{\mathbb{1}_R}{d_R}$

canonical state on $\mathcal{H}_R$ $\qquad \dim \mathcal{H}_R = d_R$

$H = H_S + H_E + H_{int}$

$\mathcal{H} = \mathcal{H}_S \otimes \mathcal{H}_E$

$\mathcal{H}_R \subseteq \mathcal{H}$

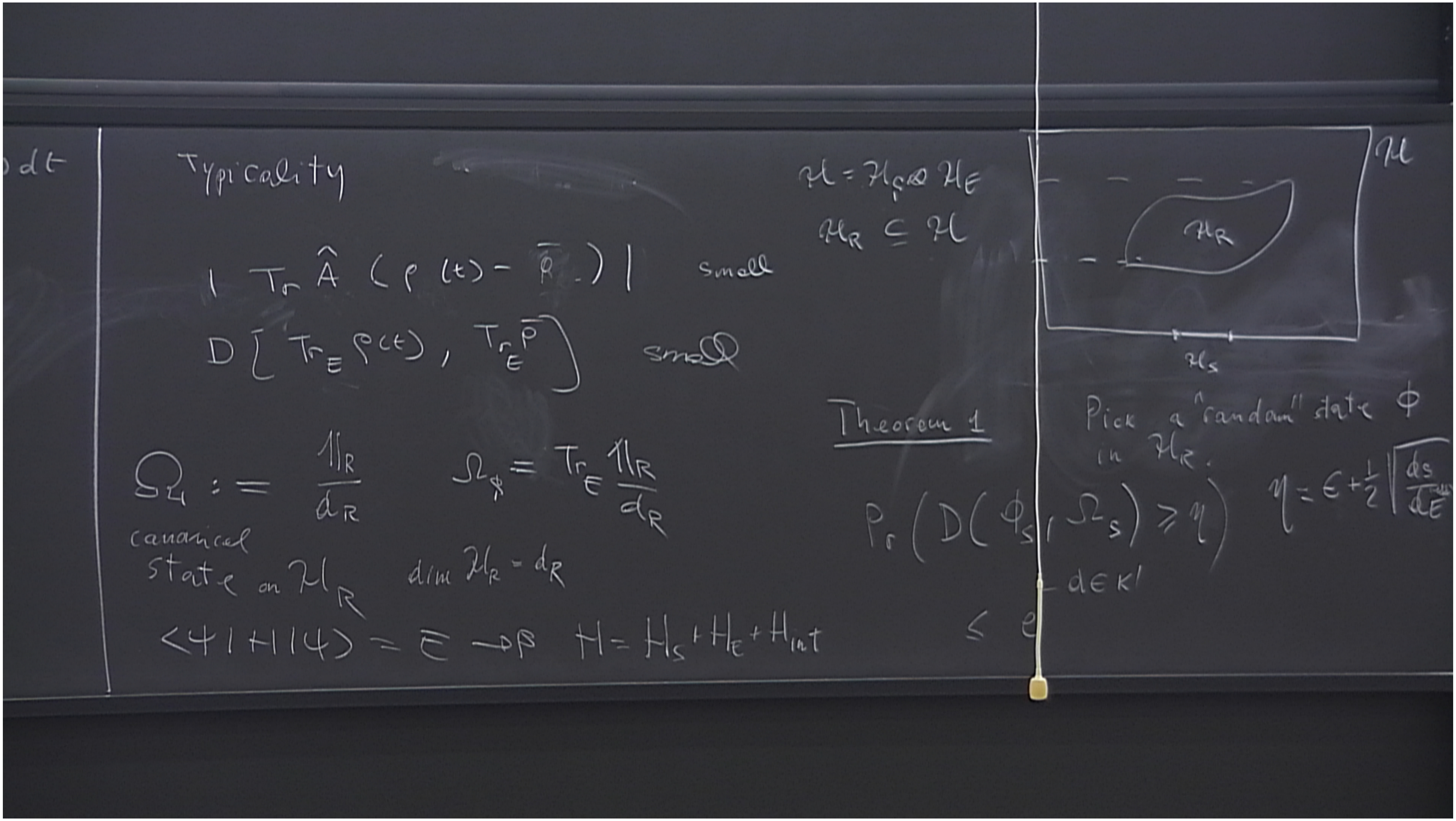


Theorem 1

Pick a "random" state ϕ in $\mathcal{H}_R$.

$$\Pr\left(D(\phi_S, \Omega_S) \geq \eta\right) \leq e^{-d\epsilon K'}$$

$$\eta = \epsilon + \frac{1}{2}\sqrt{\frac{d_S}{d_E^{\text{eff}}}}$$


Typicality
$| \mathrm{Tr}\, \hat{A} \,(\rho(t) - \bar{\rho}) |$ small
$D[\mathrm{Tr}_E\, \rho(t), \mathrm{Tr}_E\, \bar{\rho}]$ small
$\Omega_R := \frac{1\!\!1_R}{d_R}$
$\Omega_S = \mathrm{Tr}_E \frac{1\!\!1_R}{d_R}$
canonical state on $\mathcal{H}_R$
$\dim \mathcal{H}_R = d_R$
$\langle \psi | H | \psi \rangle = E \to \beta$
$H = H_S + H_E + H_{int}$
$\mathcal{H} = \mathcal{H}_S \otimes \mathcal{H}_E$
$\mathcal{H}_R \subseteq \mathcal{H}$
Theorem 1
$\Pr (D(\phi_S, \Omega_S) \geq \eta)$
$\leq e^{-d\epsilon K'}$
Pick a "random" state ϕ in $\mathcal{H}_R$.
$\eta = \epsilon + \frac{1}{2}\sqrt{\frac{d_S}{d_E^{\text{eff}}}}$
$\mathcal{H}$
$\mathcal{H}_R$
$\mathcal{H}_S$

$$e^{-iHt} |\psi_S^i\rangle \otimes |\psi_E^i\rangle$$