Title: Special Topics in Physics - Lecture 12B

Date: Apr 02, 2008 08:00 PM

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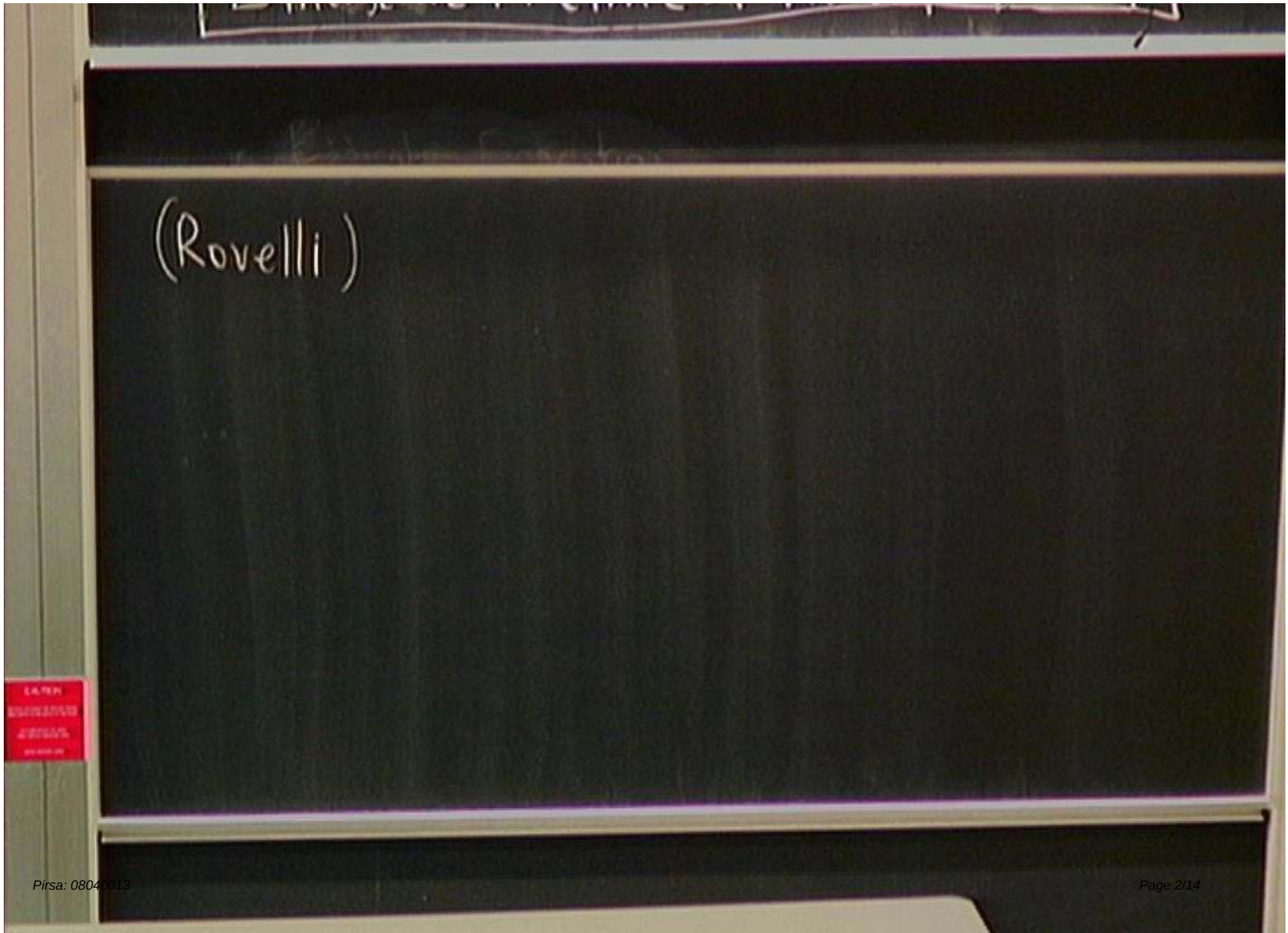
Abstract: The Problem of Time in Quantum Gravity and Cosmology


(Rovelli)

(Rovelli) →

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{\mathcal{H}}\Psi = 0$ $\mathcal{H}^{kin}$

A^{Phys} 0 on $\mathcal{H}^{Phys}$

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A^{Phys} 0 on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{A}\,\psi = 0$ $\mathcal{H}^{kin}$

A^{Phys} O on $\mathcal{H}^{Phys}$ $\langle\psi|\hat{O}|\psi\rangle$ $[\hat{O},\hat{A}] = 0$

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{H}\Psi = 0$ $\mathcal{H}^{kin}$

A^{Phys} O on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, H] = 0$

$\hat{O}$ from Ollivier $\{H, O\} = 0$

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{A}\,\Psi = 0$ $\mathcal{H}^{kin}$

A^{Phys} 0 on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[\hat{O}, \hat{H}] = 0$

$\hat{O}$ from Olivas $\{H, O\} = 0$ measure causal structure

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{A}\,\Psi = 0$ $\mathcal{H}^{kin}$

A^{phys} O on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, \hat{H}] = 0$

$\hat{O}$ from O_{class} $\{H, O\} = 0$ measure chaos structure

(J) semiclassical states have measure 0

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{H}\Psi = 0$ $\mathcal{H}^{kin}$

A^{phys} O on $\mathcal{H}^{phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, \hat{H}] = 0$

$\hat{O}$ from O_{class} $\{H, O\} = 0$ measure chaos structure

(J) semiclassical states give measure 0

(B) $\Lambda > 0$

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{H}\Psi = 0$ $\mathcal{H}^{kin}$

A^{phys} O on $\mathcal{H}^{phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, \hat{H}] = 0$

$\hat{O}$ from O_{class} $\{H, O\} = 0$ measure causal structure

(J) semiclassical states give measure Ω

(B) $\Lambda > 0$ ⇒ dS phase

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{H}\Psi = 0$ $\mathcal{H}^{kin}$

A^{phys} O on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, H] = 0$

$\hat{O}$ from O_{class} $\{H, O\} = 0$ measure chaos structure

(J) semiclassical states have measure 0

(B) $\Lambda > 0$ ⇒ dS phase $T \sim \Pi$

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{H}\Psi = 0$ $\mathcal{H}^{kin}$ ←

A^{phys} 0 on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, H] = 0$

$\hat{O}$ from O_{class} $\{H, O\} = 0$ measure causal structure

(J) semiclassical states have measure 0

(B) $\Lambda > 0$ ⇒ dS phase $T \sim \sqrt{\Lambda}$ $V(t) \sim e^{3t\sqrt{\Lambda}}$

(Rovelli) → $\mathcal{H}^{Phys}$ $\hat{H}\Psi = 0$ $\mathcal{H}^{kin}$ ←

A^{phys} O on $\mathcal{H}^{Phys}$ $\langle\Psi|\hat{O}|\Psi\rangle$ $[O, H] = 0$

$\hat{O}$ from O_{class} $\{H, O\} = 0$ measure causal structure

(J) semiclassical states give measure O

(B) $\Lambda > 0$ ⇒ dS phase $T \sim \sqrt{\Lambda}$ $V(t) \sim e^{3t\sqrt{\Lambda}}$

$P_{BH} \sim V e^{-1/\Lambda T}$