Title: PSI 17/18 - Gravitational Physics - Lecture 10

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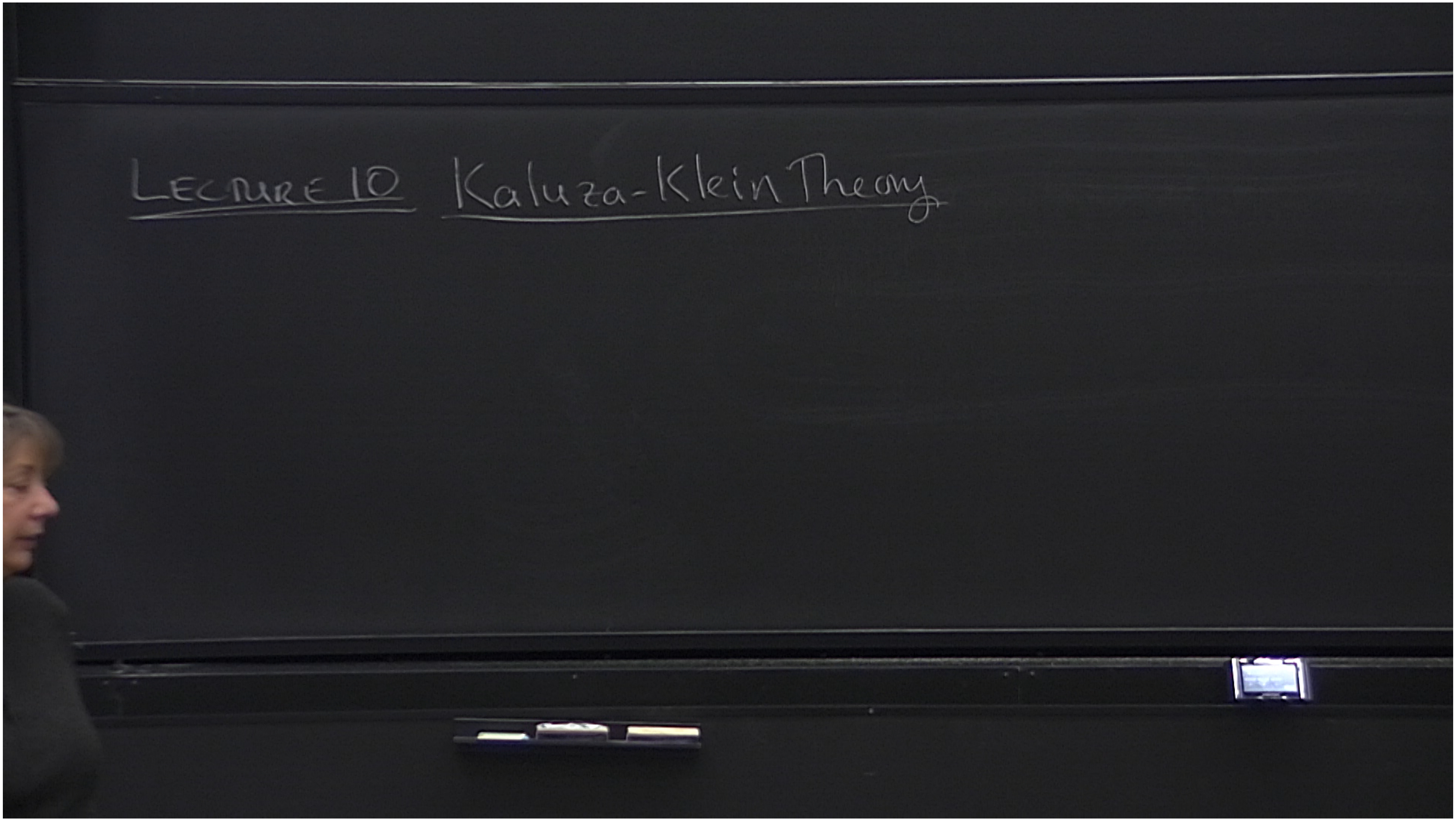
URL: http://pirsa.org/18010030

Abstract:


LECTURE 10
Kaluza-Klein Theory

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Extracts 4D gravity as a low-energy limit of higher dim^{l} gravity. The extra dimensions are small, and geometry does not depend on them.

Look at 5D gravity:

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$\frac{\partial}{\partial\psi}$ a killing vector: $\hat{g}_{\mu\nu}(x)$, $A_\mu(x)$, $\sigma(x)$

$\mu = 0,1,2,3$ — "our" spacetime.

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$\det g_5 = e^{2\sigma} \det \hat{g}$

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$\mu = 0,1,2,3$ – "our" spacetime.

Small, and geometry does not depend on them.

$\mu = 0, 1,$

Use Cartan o/n basis is

$$\underset{\sim}{\omega}^{\psi} = e^{\sigma}\left[d\psi + A_{\mu} dx^{\mu}\right]$$

$$\underset{\sim}{\omega}^{a} = e^{a}{}_{\mu}\, dx^{\mu}$$

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$$e^{a}{}_{\mu} e^{b}{}_{\nu} \eta_{ab} = \hat{g}_{\mu\nu}$$

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$\mu = 0,1,2,3$ - our space

tan. o/n basis is

$[d\psi + A_\mu dx^\mu]$

$\underbrace{{}_\mu dx^\mu}$

$e^b{}_\nu \, \eta_{ab} = \hat{g}_{\mu\nu}$

$$\underset{\sim}{d}\, \underset{\sim}{\omega}^\psi = \sigma_{,a}\, \underset{\sim}{\omega}^a \wedge \underset{\sim}{\omega}^\psi + e^\sigma E$$

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$$\underset{\sim}{d}\, \underset{\sim}{\omega}^{\psi} = \sigma_{,a}\, \underset{\sim}{\omega}^{a} \wedge \underset{\sim}{\omega}^{\psi} \ldots \sigma$$