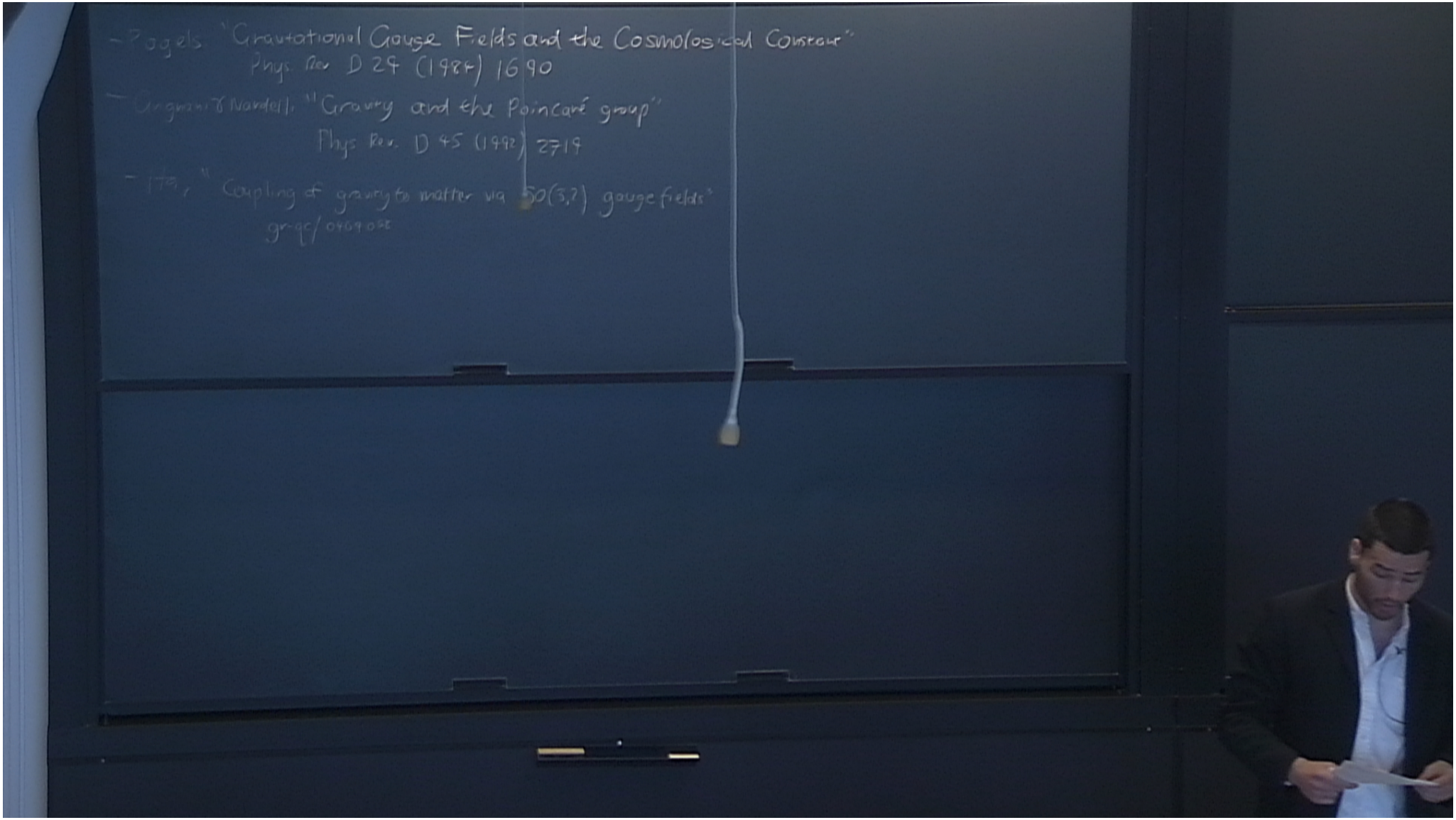
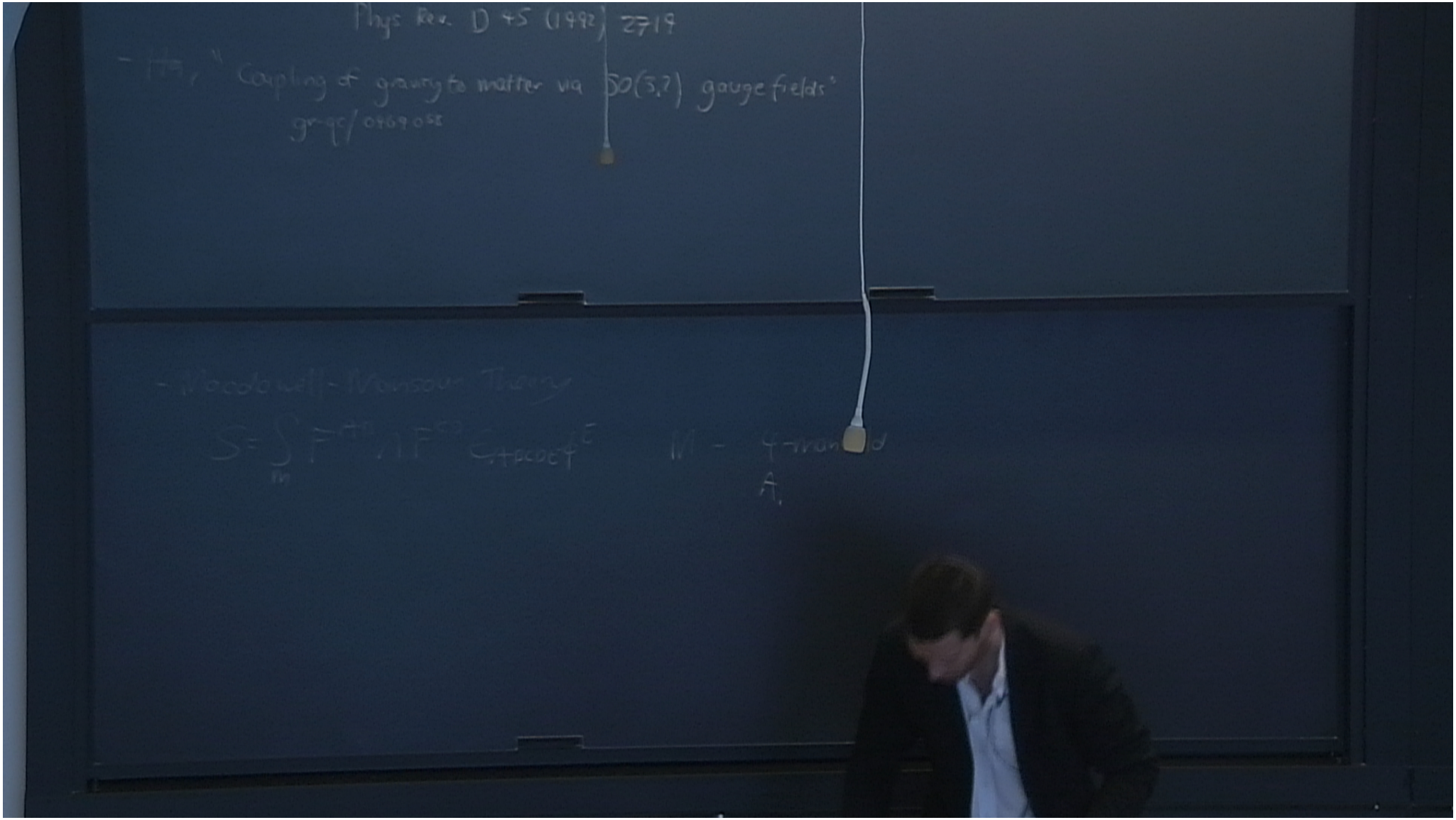
Title: TBA

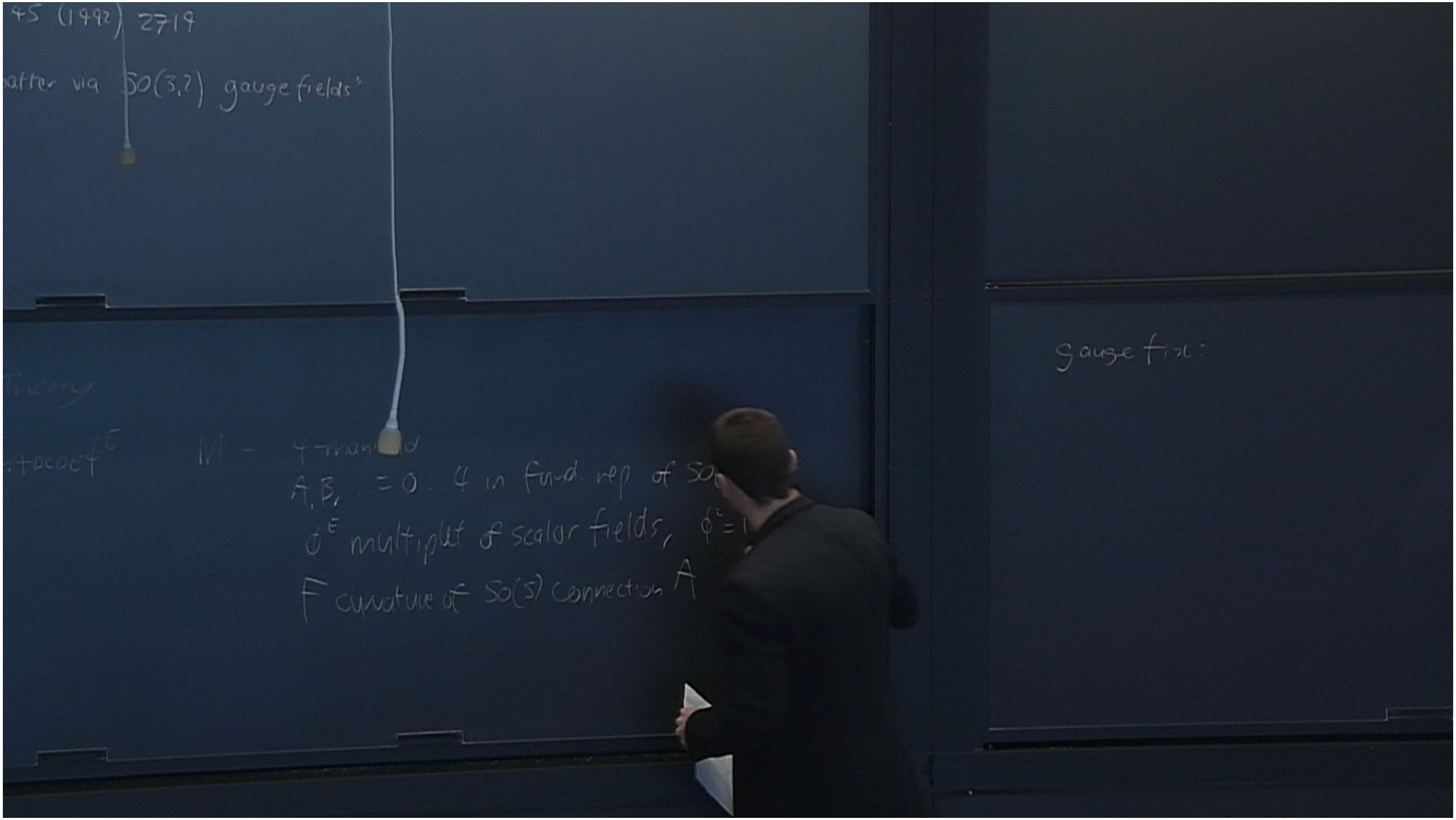
Date: May 21, 2014 03:30 PM

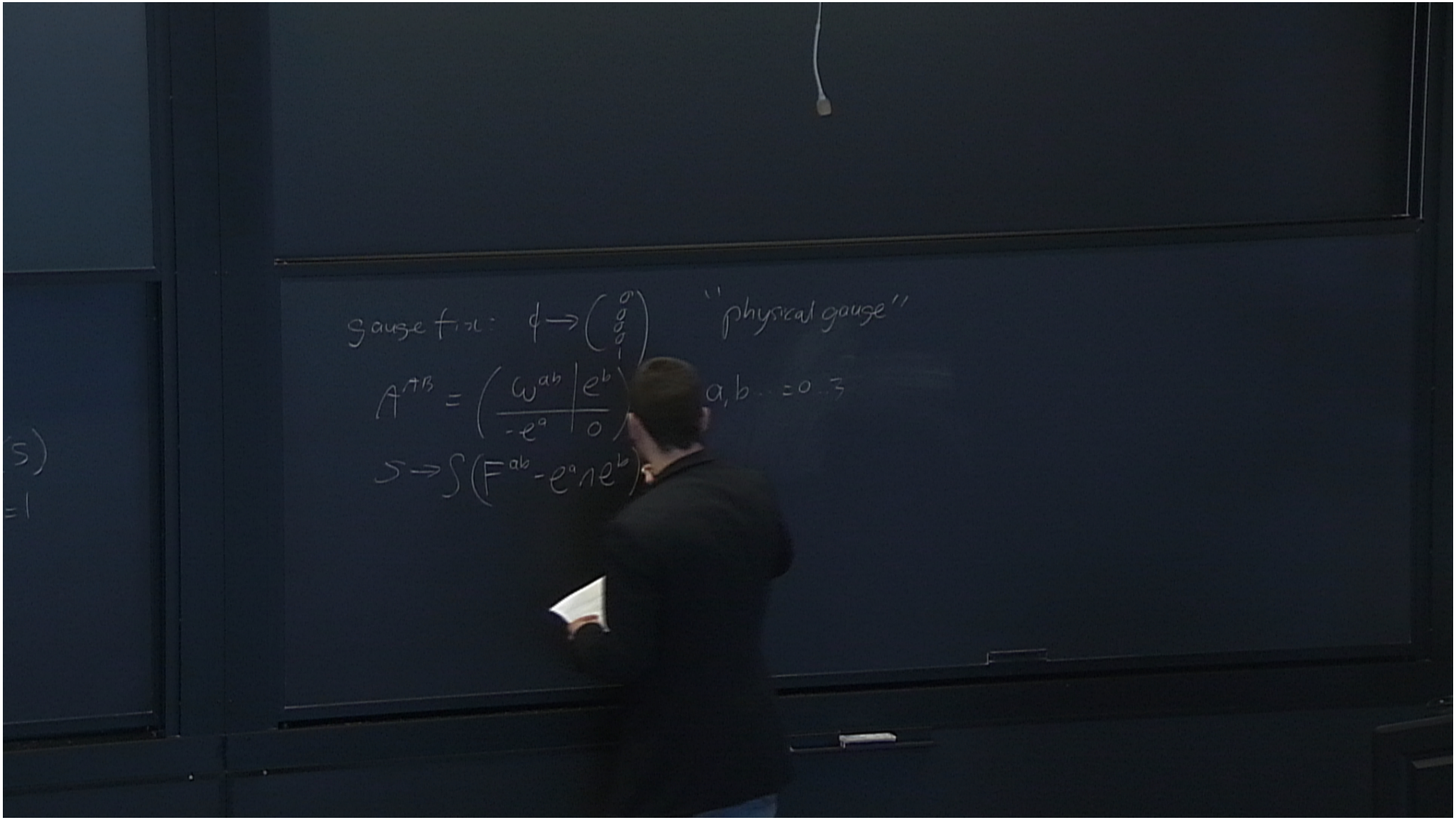
URL: http://pirsa.org/14050120

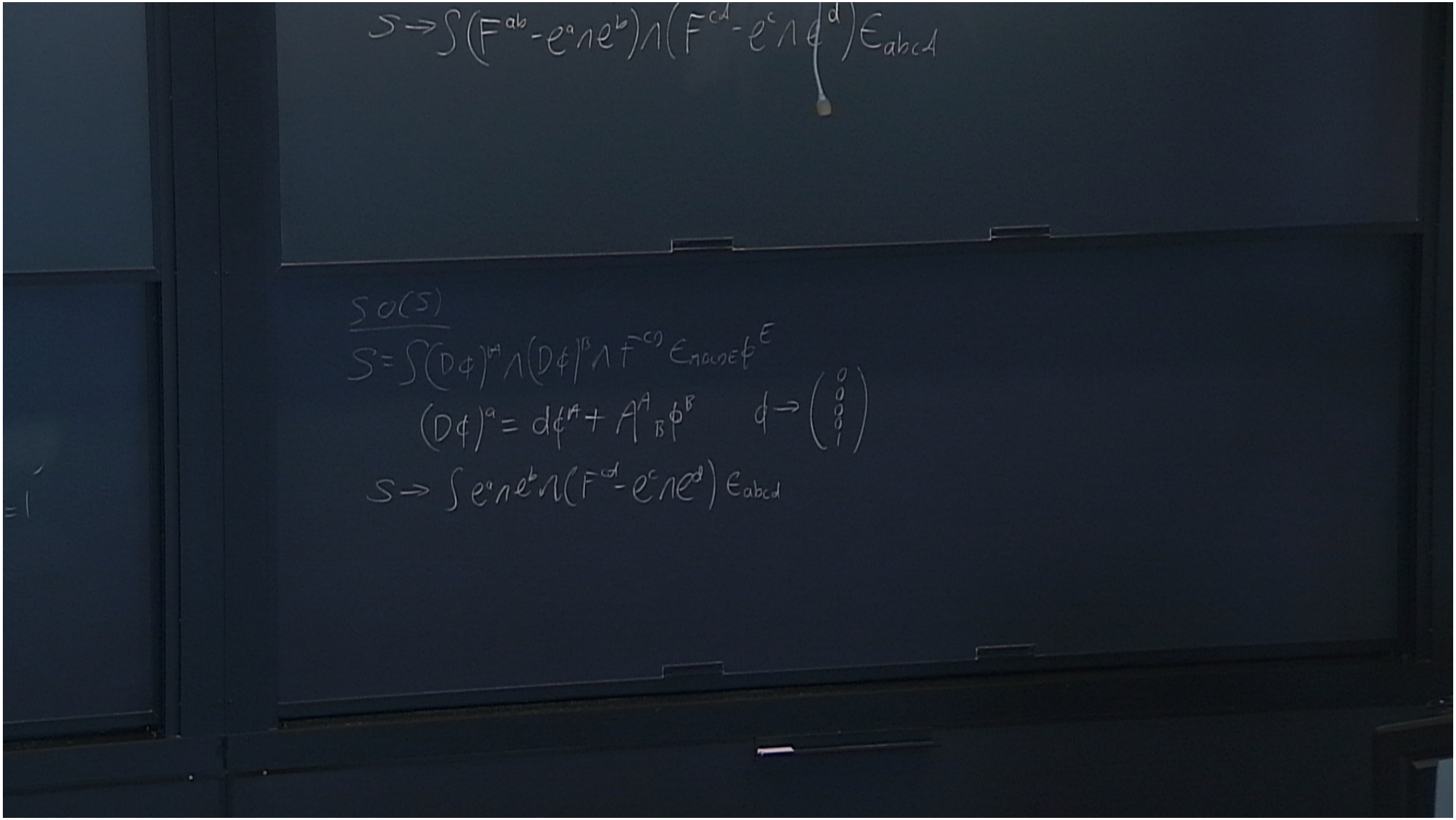
Abstract:

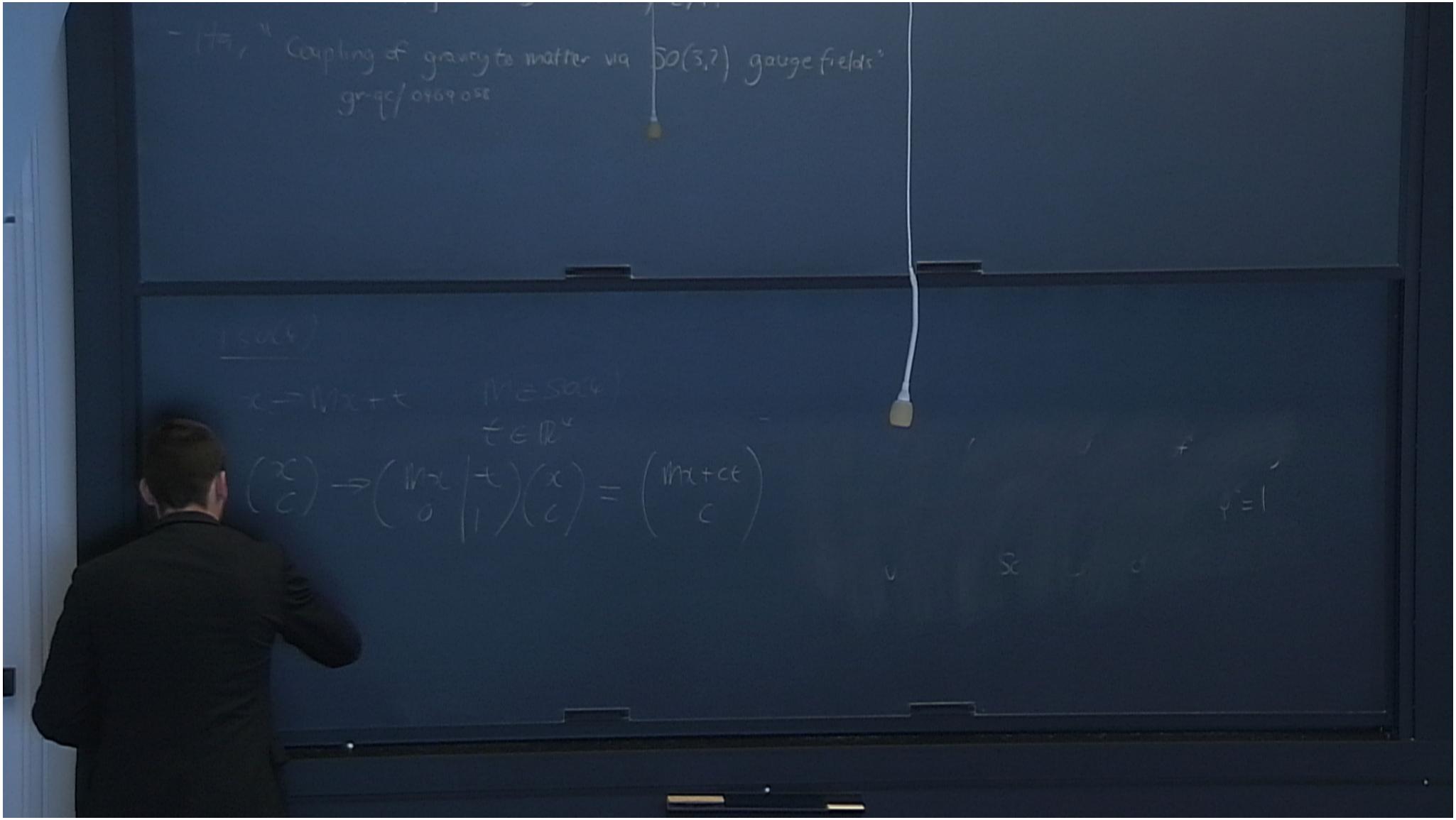

- Pagels "Gravitational Gauge Fields and the Cosmological Constant"
Phys. Rev. D 29 (1984) 1690
- Ungwan & Nandelli "Gravity and the Poincaré group"
Phys. Rev. D 45 (1992) 2719
- [17], "Coupling of gravity to matter via SO(3,2) gauge fields"
gr-qc/0409056

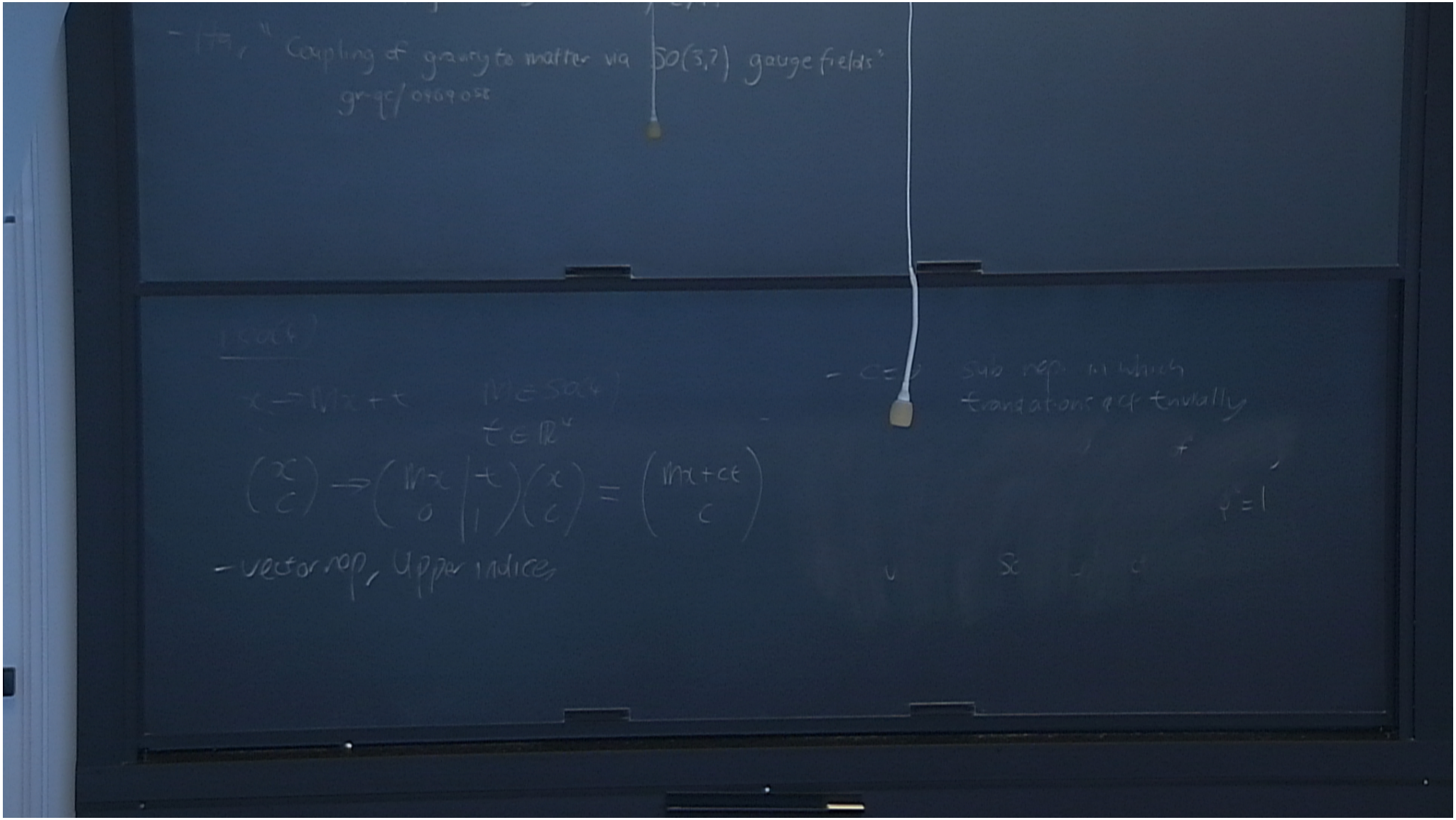

Phys Rev. D 45 (1992) 2719
"Coupling of gravity to matter via SO(3,1) gauge fields"
gr-qc/0409058

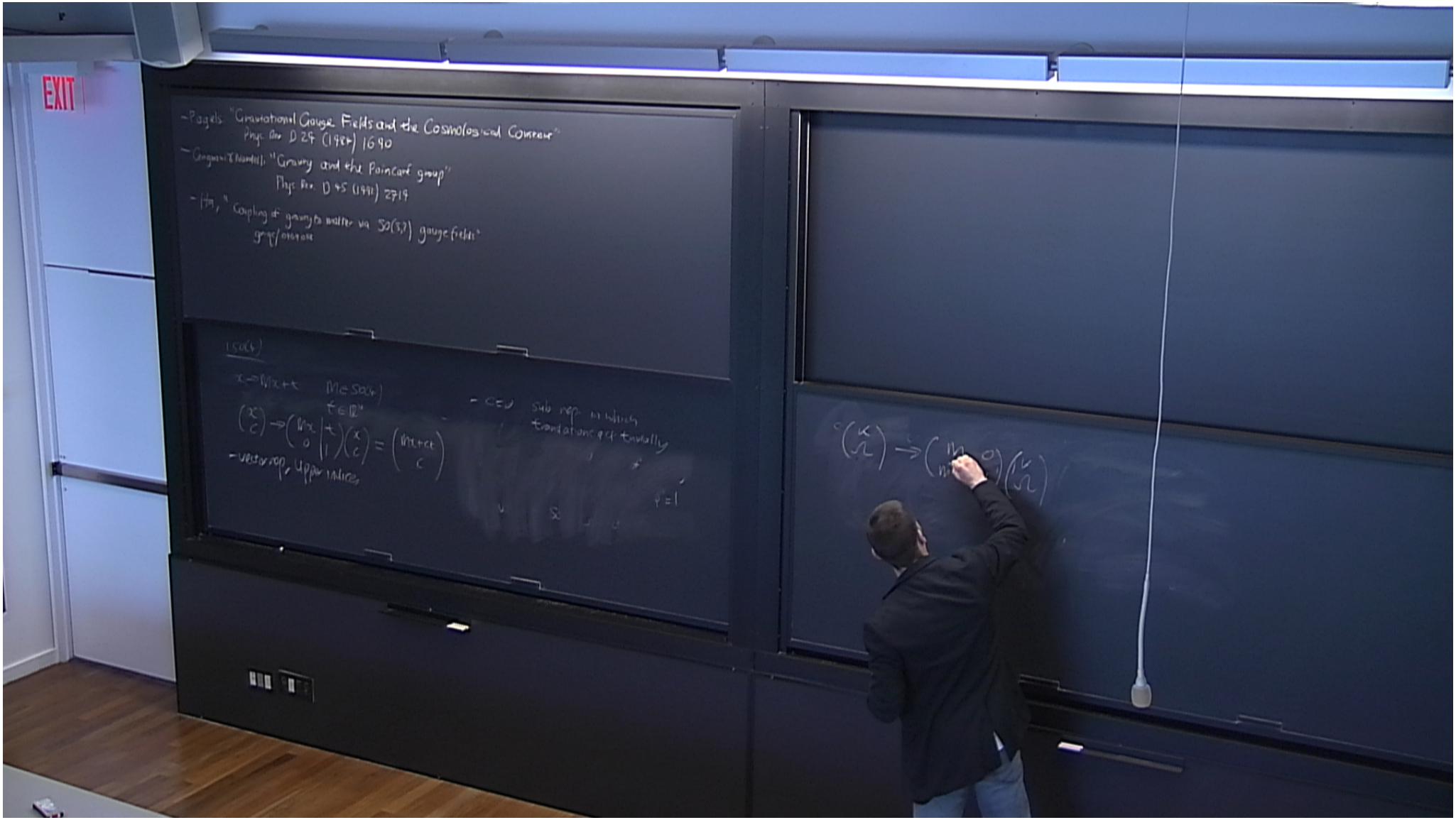

45 (1992) 2719
atter via SO(3,2) gauge fields"
Theory
M - 4-manifold
A, B, ... = 0 .. 4 in fund. rep of SO
ϕ^E multiplet of scalar fields, $\phi^2 = 1$
F curvature of SO(5) connection A
gauge fix:

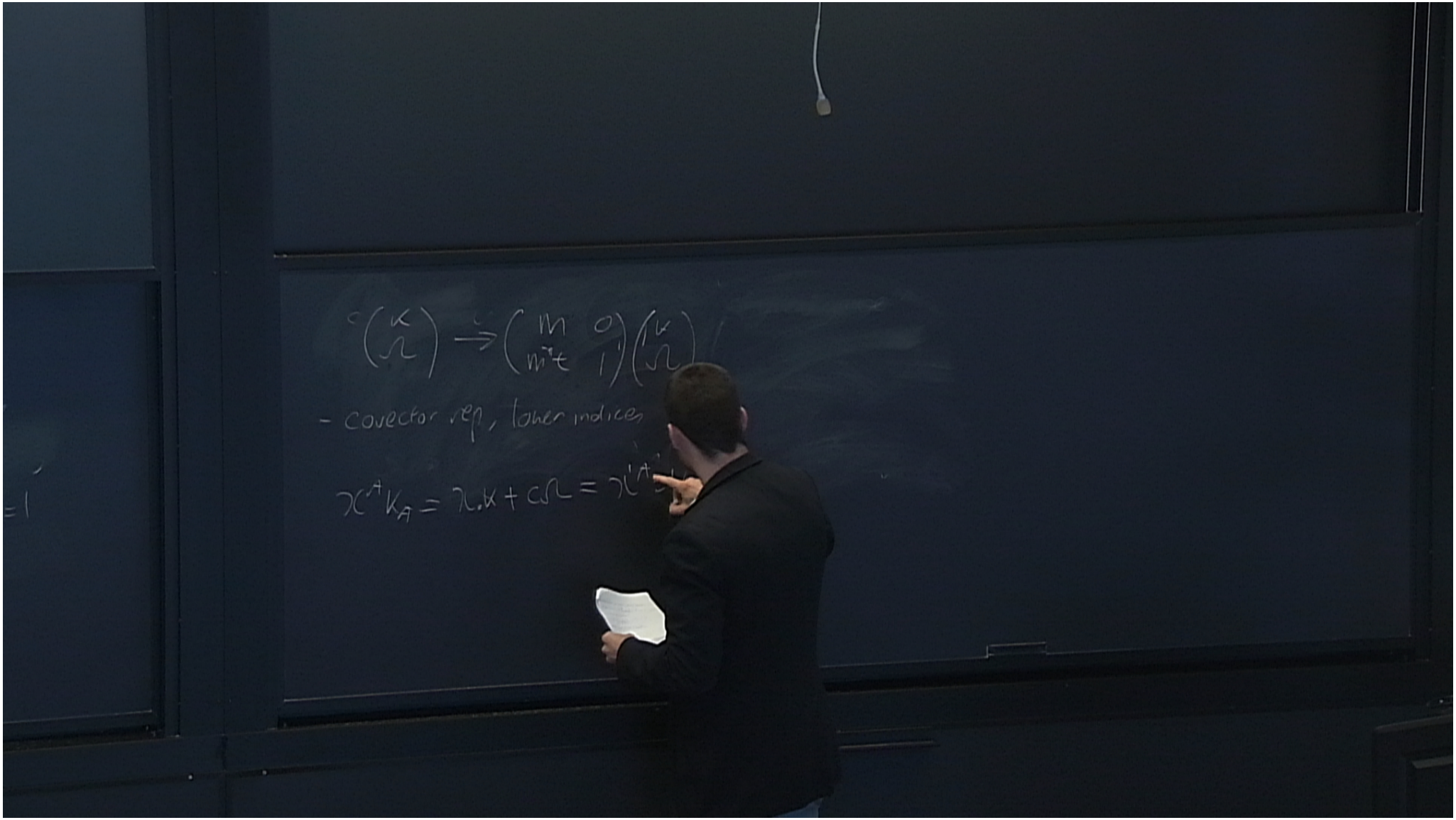

gauge fix: $\phi \to \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix}$ "physical gauge"
$A^{AB} = \left(\begin{array}{c|c} \omega^{ab} & e^b \\ \hline -e^a & 0 \end{array}\right)$ $a, b \ldots = 0 \ldots 3$
$S \to S(F^{ab} - e^a \wedge e^b)$

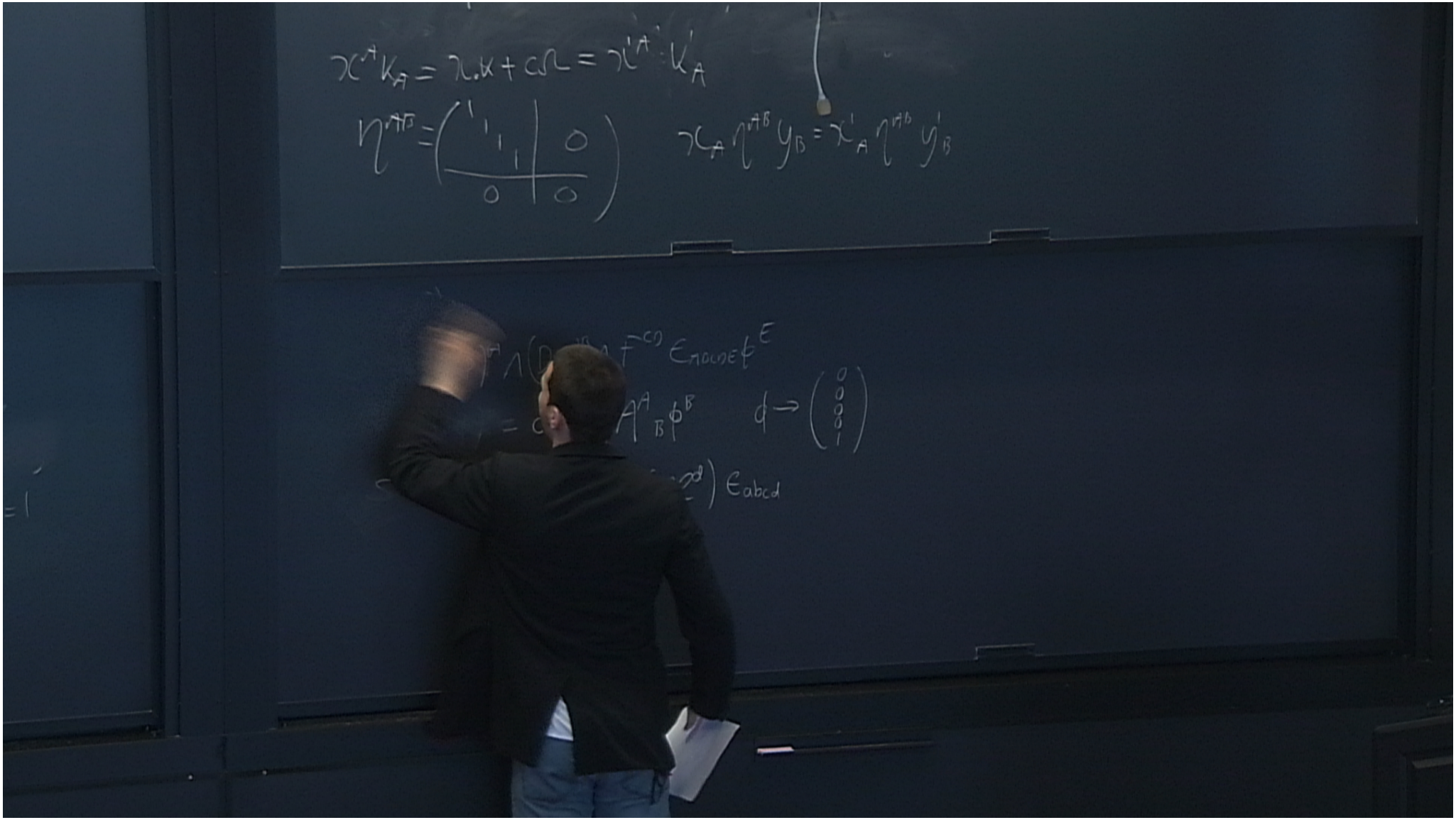

$S \to \int (F^{ab} - e^a \wedge e^b) \wedge (F^{cd} - e^c \wedge e^d) \epsilon_{abcd}$
$SO(5)$
$S = \int (D\phi)^A \wedge (D\phi)^B \wedge F^{CD} \epsilon_{ABCDE} \phi^E$
$(D\phi)^a = d\phi^A + A^A{}_B \phi^B \qquad \phi \to \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{pmatrix}$
$S \to \int e^a \wedge e^b \wedge (F^{cd} - e^c \wedge e^d) \epsilon_{abcd}$

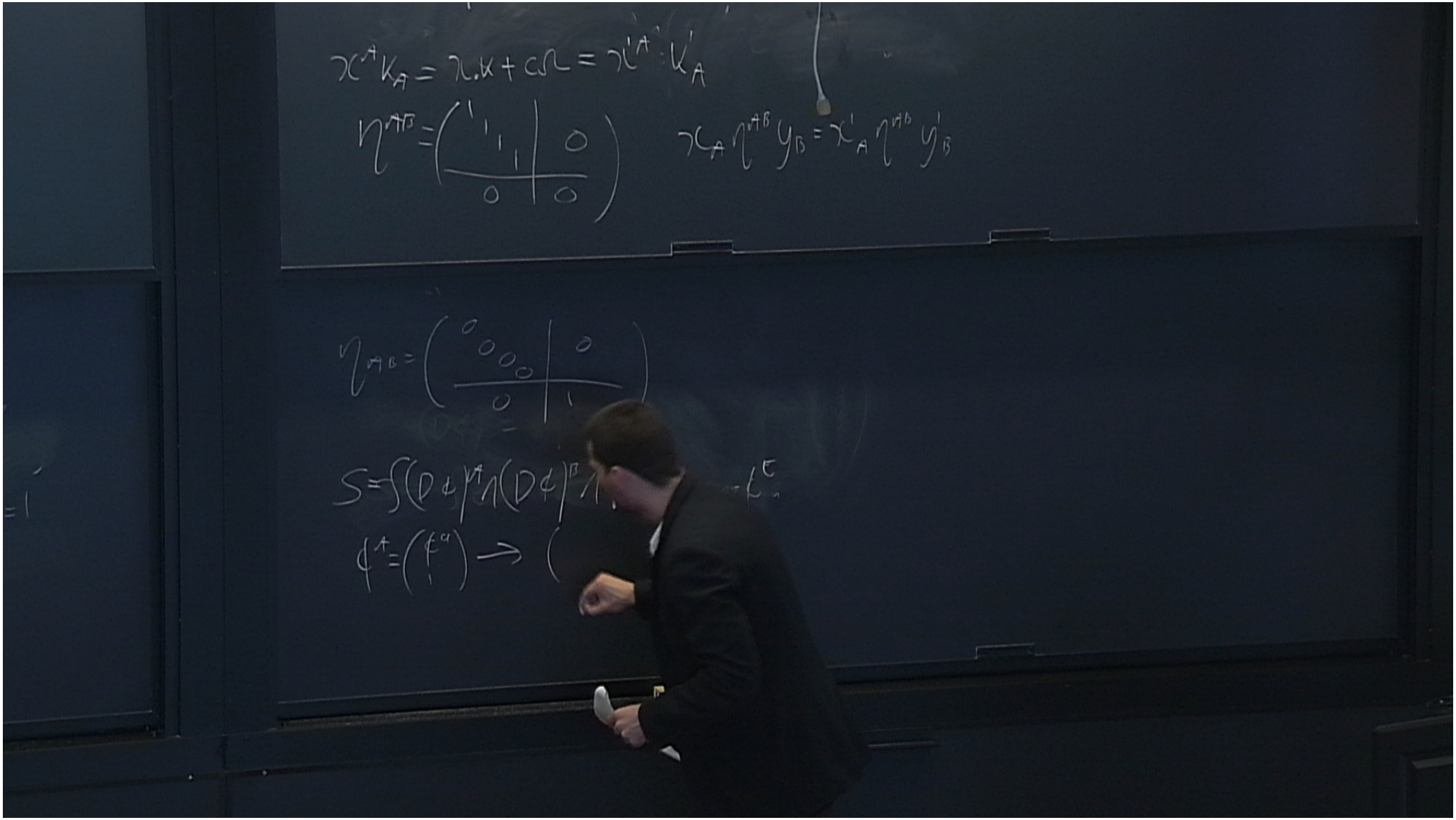

"Coupling of gravity to matter via SO(3,2) gauge fields"
gr-qc/0469058
x → Mx + t
M ∈ SO(4)
t ∈ ℝ^4
(x c) → (Mx | t; 0 | 1)(x c) = (Mx + ct; c)

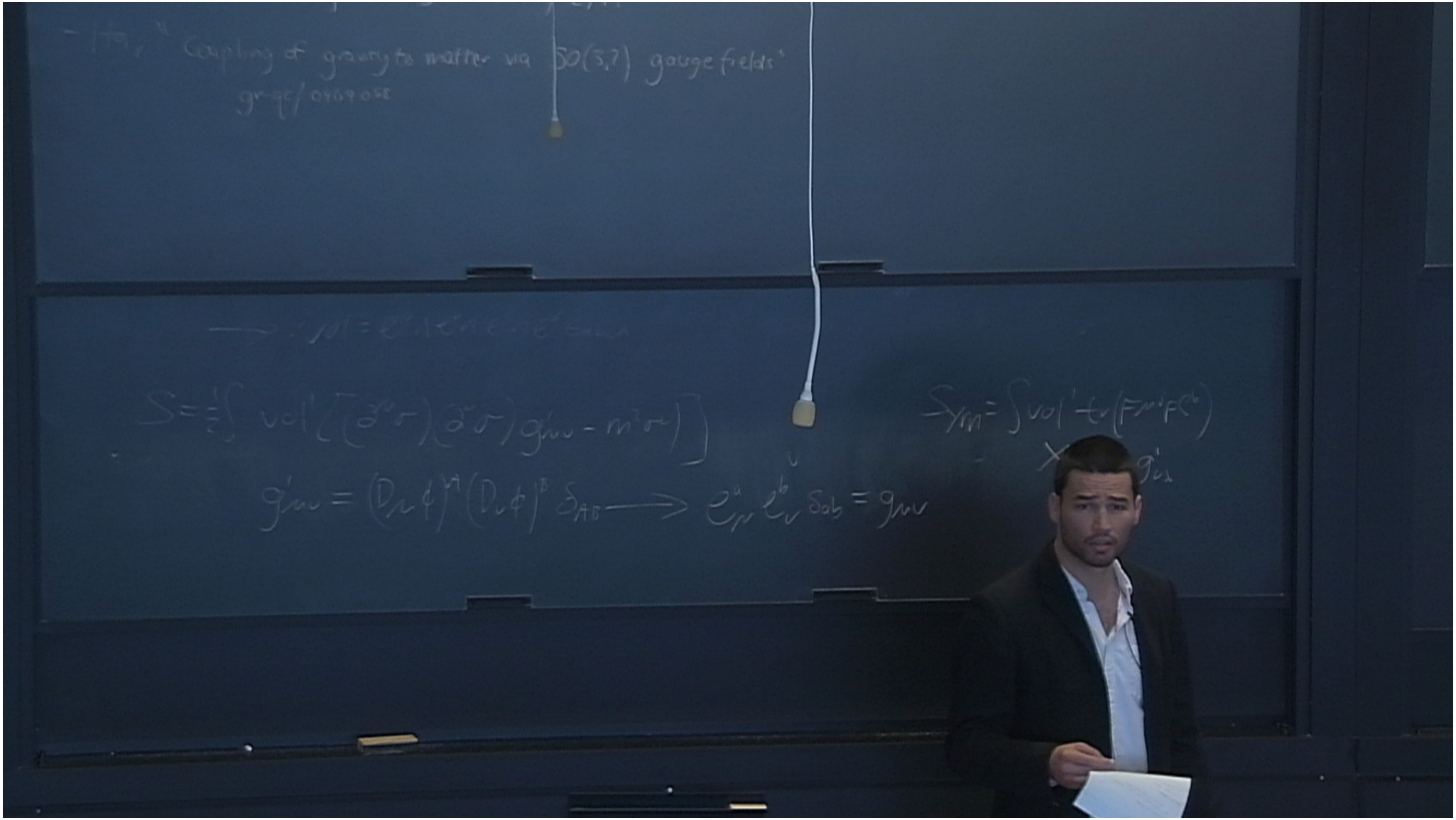

"Coupling of gravity to matter via SO(3,7) gauge fields"
gr-qc/0909.058
- vector rep, upper indices


EXIT
- Pagels "Gravitational Gauge Fields and the Cosmological Constant"
Phys. Rev. D 25 (1982) 1690
- Gingrich & Rumbutis "Gravity and the Poincaré group"
Phys. Rev. D 45 (1992) 2719
- Itin, "Coupling of gravity to matter via SO(3,1) gauge fields"
grqc/0010026
ISO(4)
x → Mx + t M ∈ SO(4) t ∈ ℝ⁴
- vector rep, upper indices
- CCJ sub rep in which translations act trivially


- covector rep, lower indices


$x^A K_A = x.K + c\Omega = x'^A K'_A$
$\eta^{AB} = \left(\begin{array}{cccc|c} 1 & & & & \\ & 1 & & & 0 \\ & & 1 & & \\ & & & 1 & \\ \hline & & 0 & & 0 \end{array}\right)$
$x_A \eta^{AB} y_B = x'_A \eta^{AB} y'_B$
ϵ_{abcd}


$\chi^A \kappa_A = \chi_A \kappa + c.c. = \chi'^A \kappa'_A$
$\eta^{AB} = \left(\begin{array}{c|c} 1 & 0 \\ 1 & \\ \hline 0 & 0 \end{array}\right)$
$\chi_A \eta^{AB} y_B = \chi'_A \eta^{AB} y'_B$
$\eta_{AB} = \left(\begin{array}{c|c} 0 & 0 \\ 0 & \\ \hline 0 & 1 \end{array}\right)$
$S = \int (D\phi)^A \wedge (D\phi)^B \wedge$
$\phi^A = \left(\begin{array}{c} \phi^a \\ \phi \end{array}\right) \rightarrow$


Coupling of gravity to matter via SO(3,7) gauge fields
gr-qc/0409058
$S = \frac{1}{2}\int \mathrm{vol}\left[\left(\partial^\mu \sigma\right)\left(\partial^\nu \sigma\right) g_{\mu\nu} - m^2 \sigma^2\right]$
$g'_{\mu\nu} = \left(D_\mu \phi\right)^A \left(D_\nu \phi\right)^B \delta_{AB} \longrightarrow e^a_\mu e^b_\nu \delta_{ab} = g_{\mu\nu}$
$S_{YM} = \int \mathrm{vol}\, \mathrm{tr}\left(F^{\mu\nu} F^{\rho\sigma}\right)$