Title: Thoughts stolen from the enemy

Date: Apr 16, 2015 11:00 AM

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Abstract: Subfactors and VOAs should both describe CFT, but what is relatively easy in one formulation can be very difficult in the other. In my talk I'll describe lessons the VOA world can learn from the subfactor one.

$$\chi_1 = q^{-\frac{1}{3}}\left(1 + 6q + 120q^2 + \cdots\right)$$

$$\chi_2 = q^{\frac{2}{3}}\left(80 + 1250q + \cdots\right)$$

$$\chi_3 = \chi_4 = q^{2/3}\left(81 + 1377q + 15833q^2 + \cdots\right)$$

$$\chi_5 = 3 + 243q + 2916q^2 + \cdots$$

$$\chi_6 = q^{\frac{1}{3}}\left(27 + 594q + 5967q^2 + \cdots\right)$$

$$\chi_7 = q^{5/39}\left(7 + 292q + 3204q^2 + \cdots\right)$$

$$\chi_8 = q^{20/39}\left(42 + 777q + 7147q^2\right)$$

$$\chi_9 = q^{32/39}\left(119 + 1623q + 12996q^2\right)$$

$$\chi_{10} = q^{2/39}\left(5 + 229q + 2738q^2 + \cdots\right)$$

$$\chi_{11} = q^{4/39}\left(13 + 349q + 3801q^2\right)$$

$$\chi_{12} = q^{11/39}\left(14 + 446q + 4459q^2\right)$$

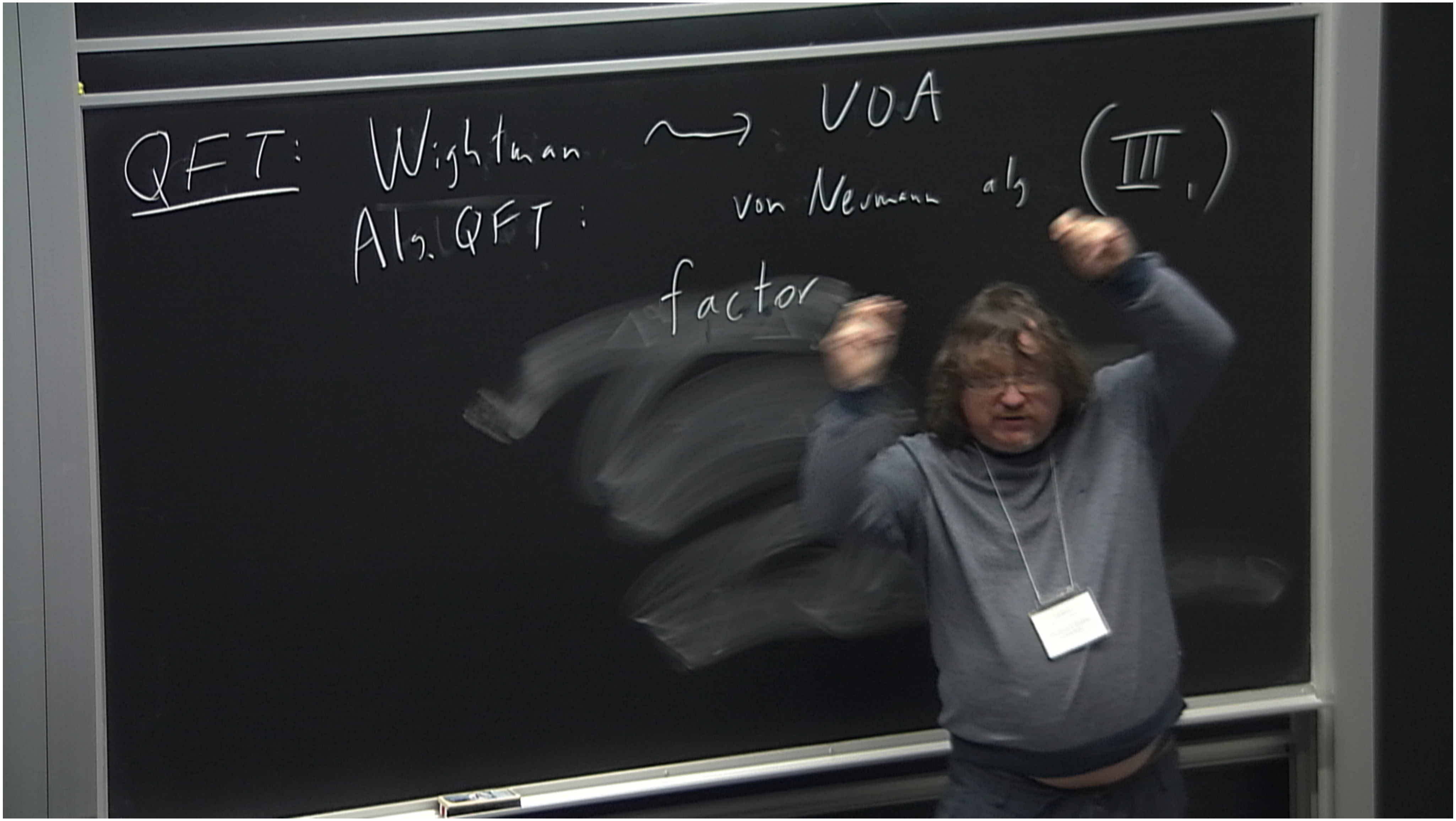
D_3

M.T.C.

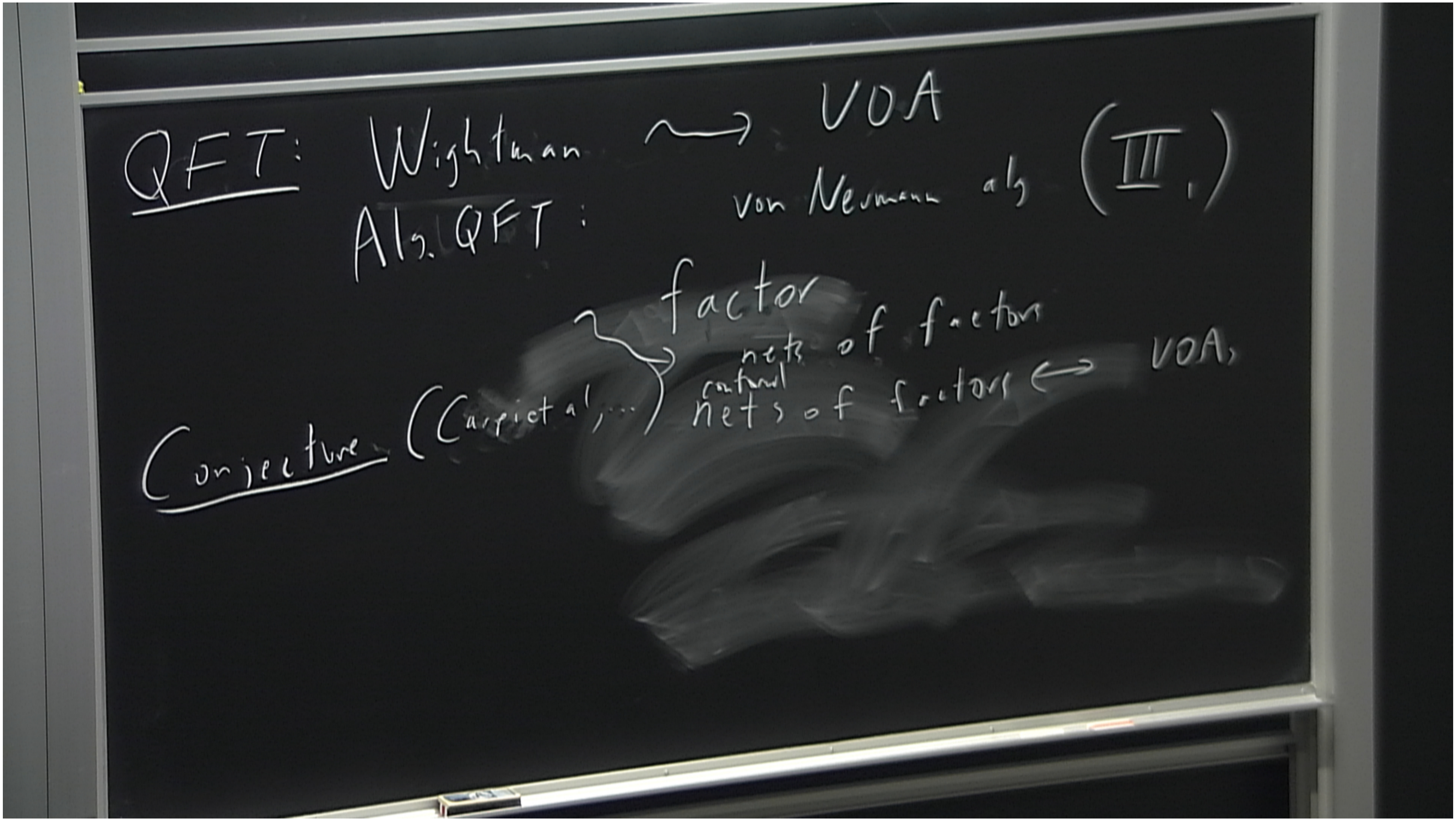
$E_6 \oplus A_2$

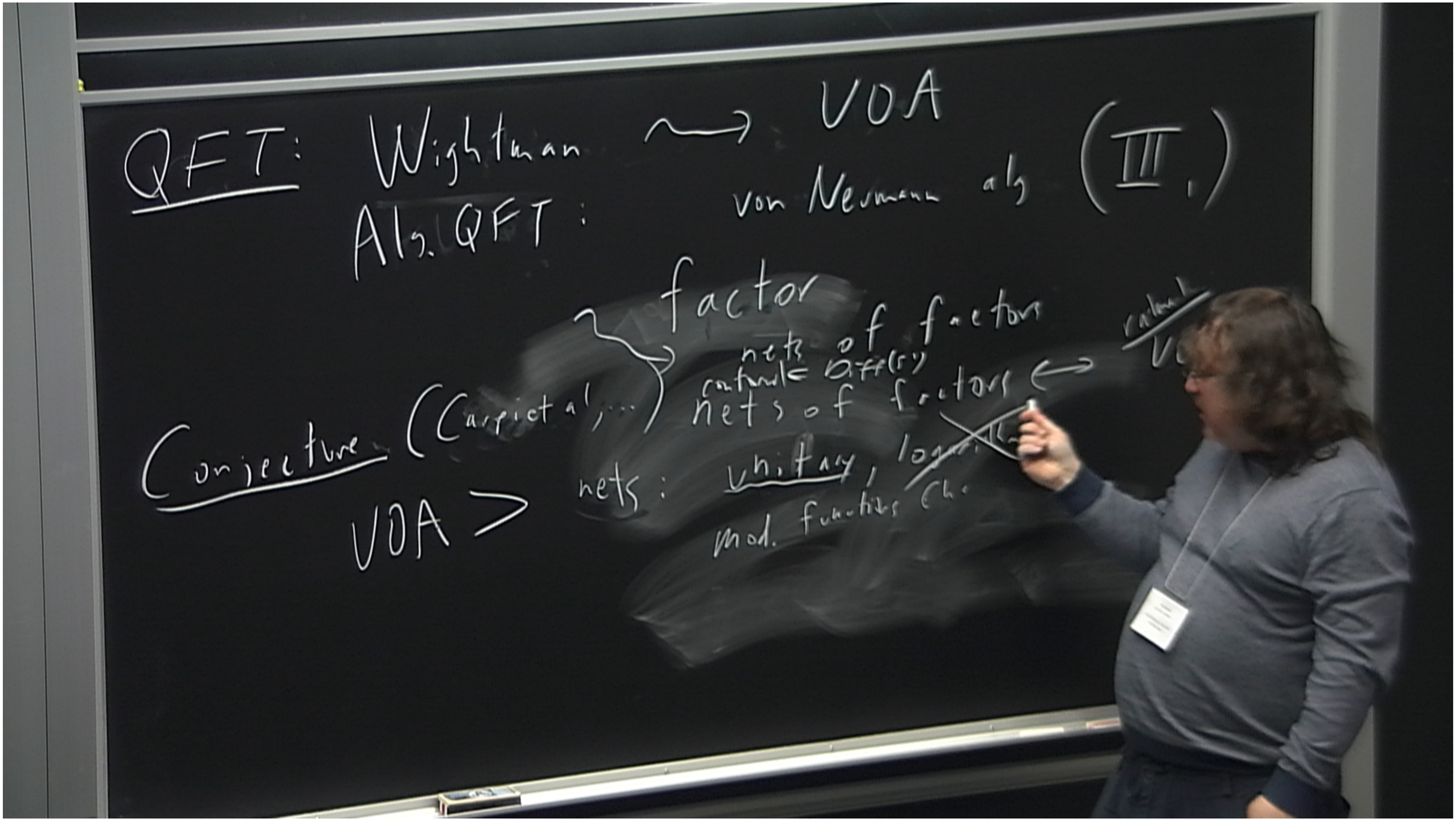
$V(G_{2,1} \oplus F_{4,1})$

D_1



QFT: Wightman ⟶ VOA
Alg. QFT: von Neumann alg (III₁)
factor


QFT: Wightman ⟶ VOA
Alg. QFT : von Neumann alg (III_1)
factor
nets of factors
Conjecture (Carpi et al, ...) conformal nets of factors ⟷ VOA,


QFT: Wightman ⟶ VOA
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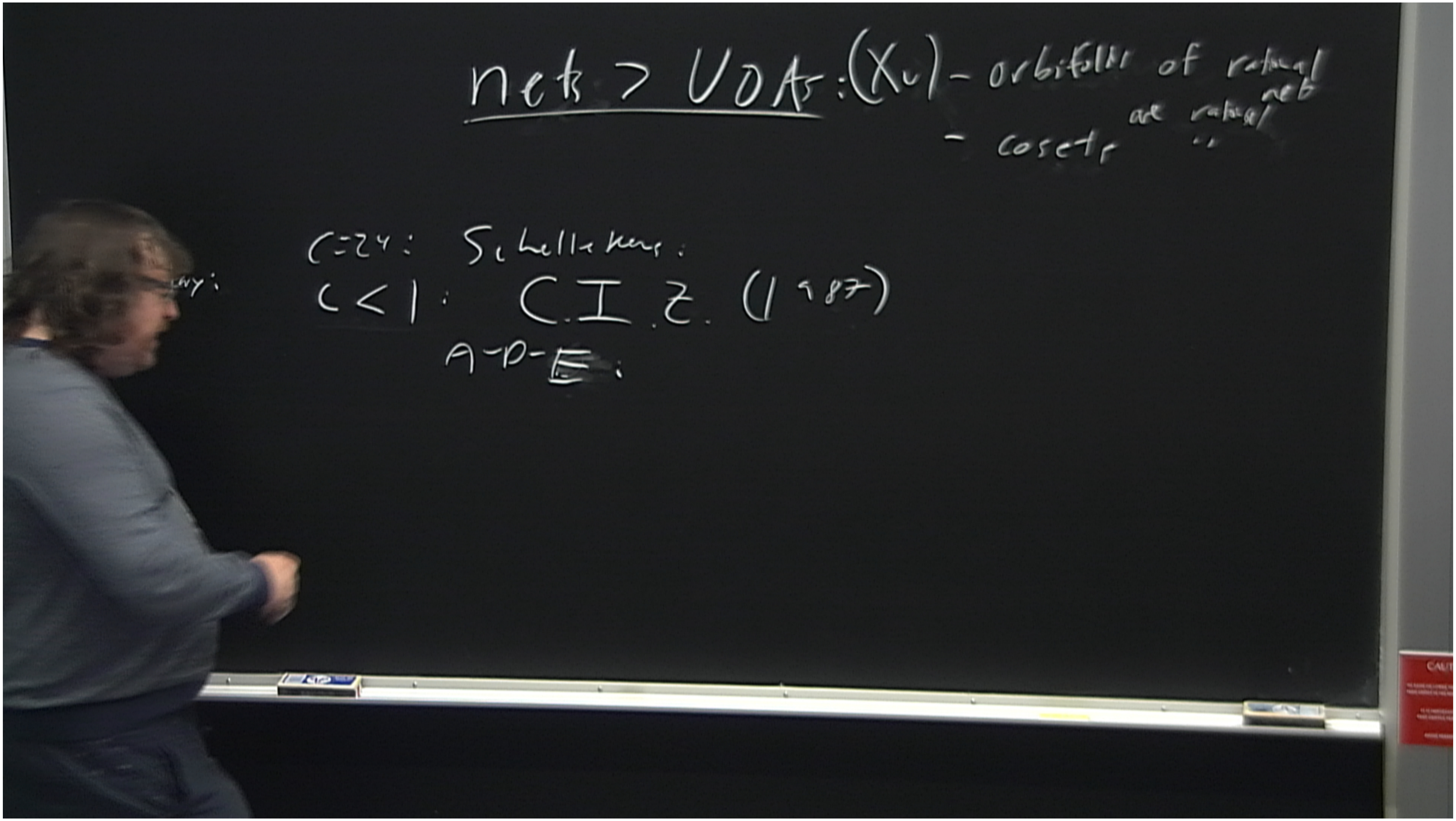
Conjecture (Carpi et al, ...)
VOA > nets:
unitary,
mod. functions

nets > VOAs: (X_v) - orbifolds of rational nets are rational

- cosets "


nets > VOAs: (X_v) - orbifolds of rational nets are rational
- cosets " "
c=24: Schellekens:
c<1: C.I.Z. (1987)
A-D-E:

nets > VOAs: (X_ν) - orbifolds of rational nets are rational
- cosets ''

unitary: $c=24$: Schellekens:

$c<1$: C.I.Z. (1987)

A-D-E:

$A_m A_{m-1}$ $\quad c = 1 - \frac{6}{m(m+1)}$: $\quad A_{1,m-1} \subset A_{1,m-2} \oplus A_{1,1}$

Dong-Liu $\quad E_8 A_{30}$: $\quad A_{1,28} \subset G_{2,1}$

$\longrightarrow A_{28} E_8$:

QFT: Wightman $\rightsquigarrow$ VOA

Alg. QFT: von Neumann alg (III_1)

factor

nets of factors

conformal nets of factors $(\mathrm{Diff}(S^1))$ $\longleftrightarrow$ rational VOA

Conjecture (Carpi et al, ...)

VOA $\supset$ nets: unitary, ~~logarithmic~~

mod. functions, Ch. higher genus $\leftarrow$

$\mathbb{R}^{1,1}$ $S^1 \times S^1$

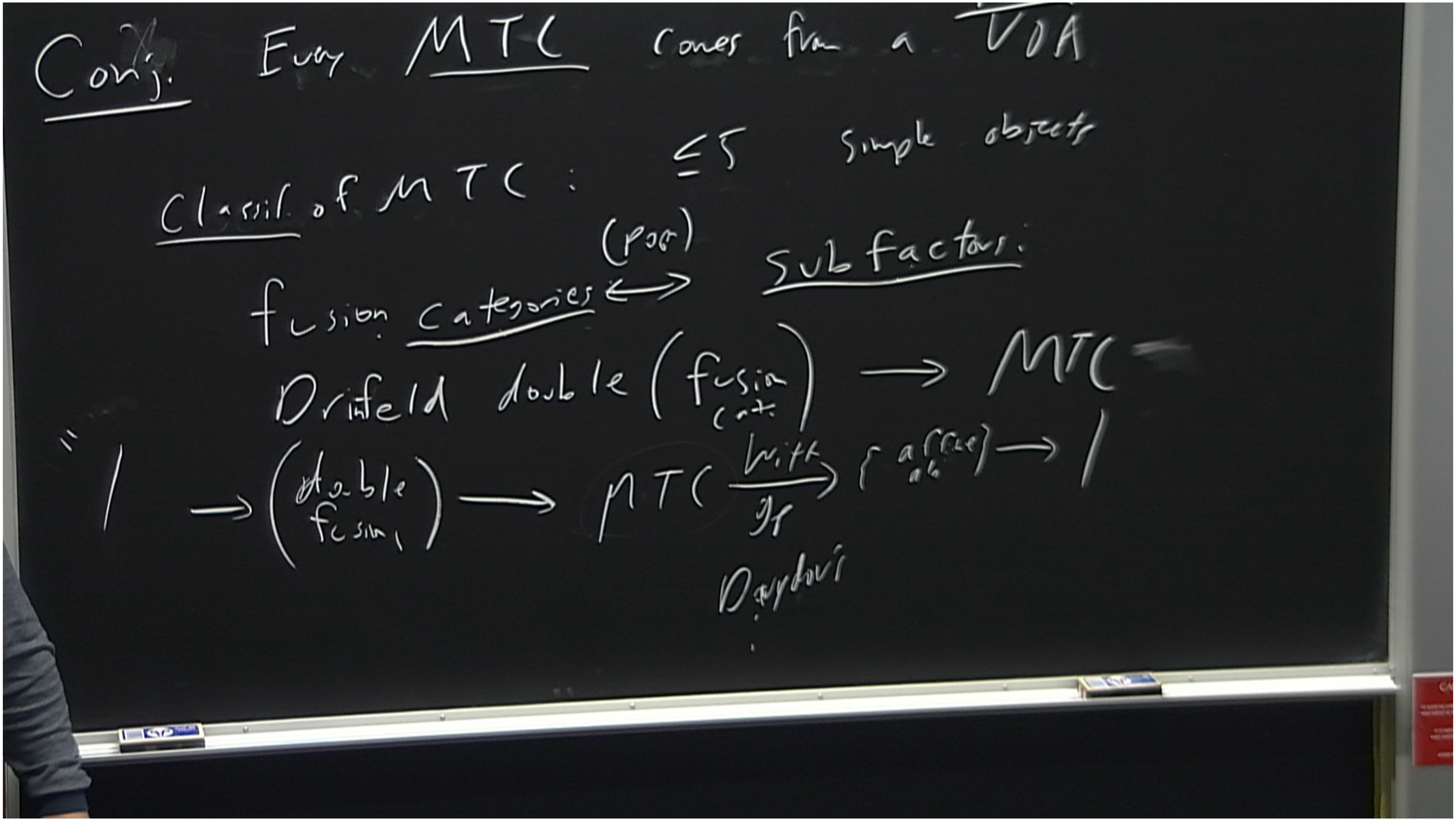
Conj: Every MTC comes from a VOA

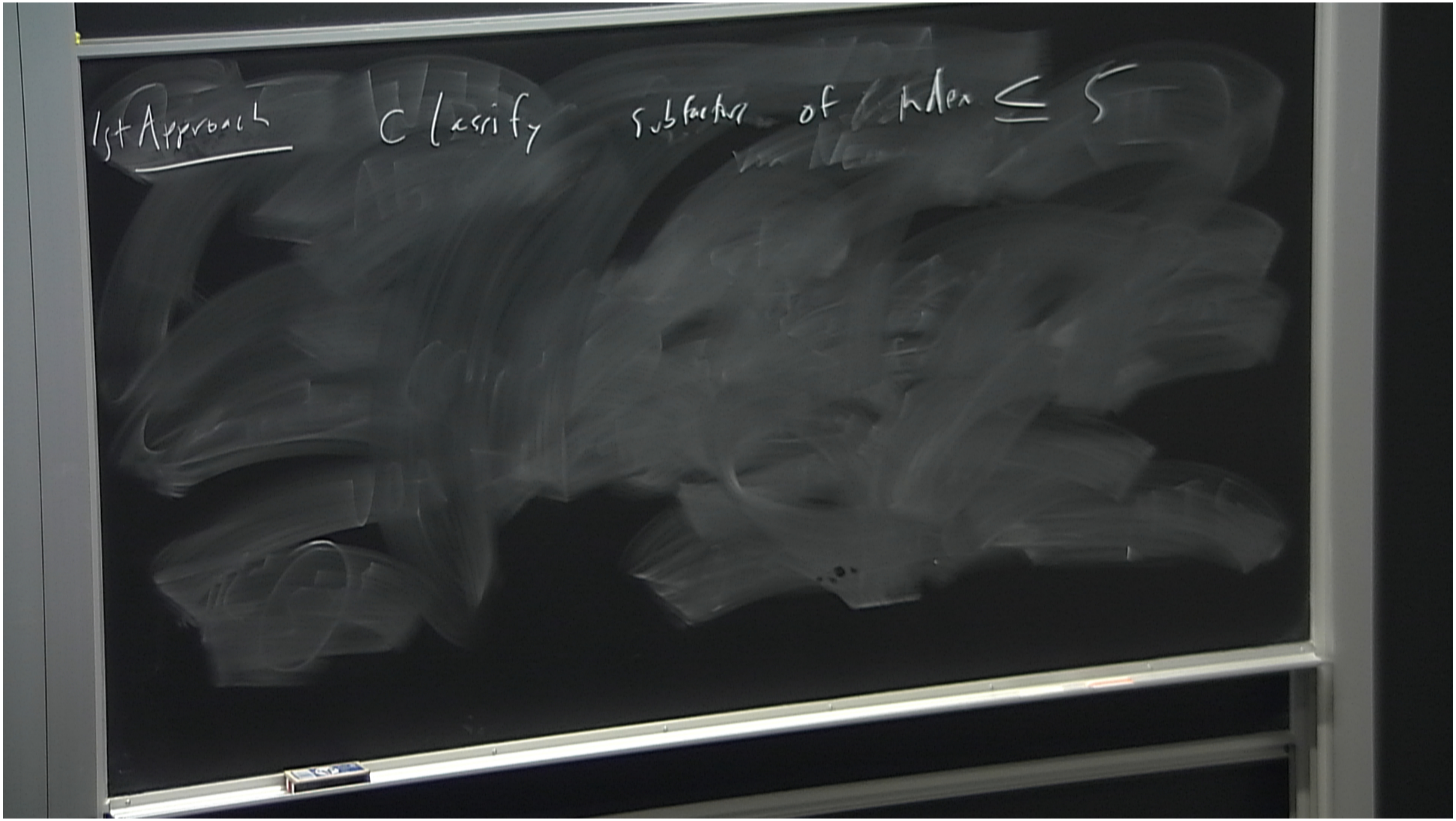
Classif. of MTC: ≤ 5 simple objects

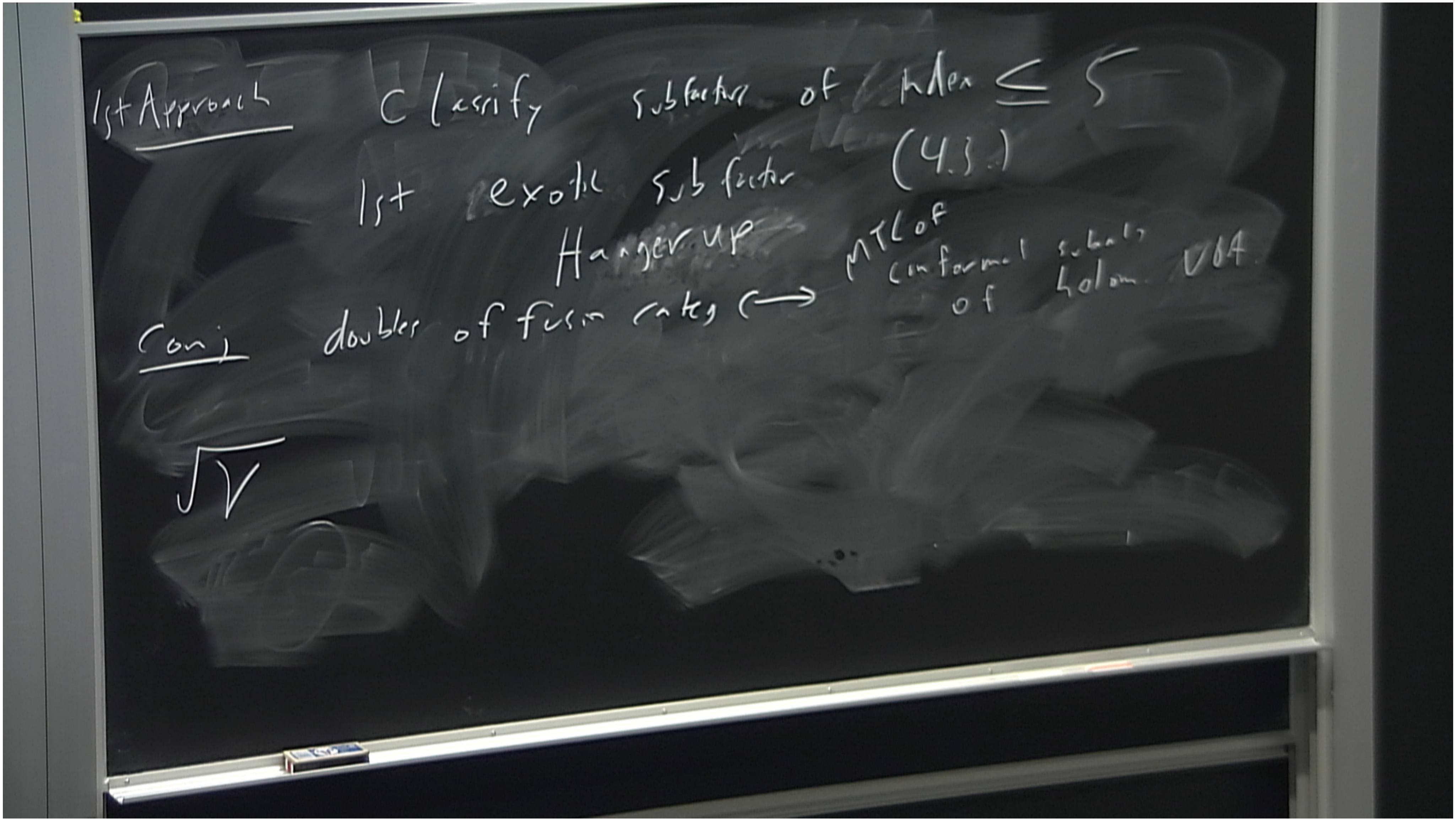
fusion categories $\overset{(\text{pos})}{\longleftrightarrow}$ Subfactors:

Drinfeld double $\left(\begin{array}{c}\text{fusion}\\ \text{cat.}\end{array}\right) \longrightarrow$ MTC

" $\longrightarrow \left(\begin{array}{c}\text{double}\\ \text{fusion}\end{array}\right) \longrightarrow$ MTC $\xrightarrow[g_f]{\text{with}}$


Conj. Every MTC comes from a VOA
Classif. of MTC: ≤ 5 simple objects
(pos)
fusion categories ⟷ Subfactors:
Drinfeld double (fusion cat.) ⟶ MTC
with
gr
Davydov


1st Approach Classify subfactors of index ≤ 5


1st Approach
Classify subfactors of index ≤ 5
1st exotic subfactor (4.3.)
Haagerup
Conj
doubles of fusion categ ⟷ MTC of conformal subalg of holom. VOA
√V

1st exotic ...

Haagerup

Conj doubles of fusion categs $\longleftrightarrow$ MTC of conformal subalgs of holom. VOA V of V^G

$\sqrt{V^G} \longleftarrow$ reps of finite gp.

2nd approach: look at subfactors with 8er fan structure