Factorization algebras & functorial field theories

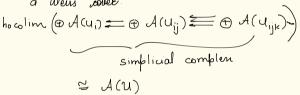
thm: A factorization algebra on G manifolds determines, functorial field theory.

dignession: Factorization algebra on G-manifolds:

def Prefactorization algebra: U —  $\cdot U \longrightarrow A(U)$  as chain complex here now U is a G-manifold

· U, Gu, , U, Gu embeddings with disjoint images (compatible)  $A(U_7 \otimes \cdots \otimes A(U_K) \longrightarrow A(U)$ 

Factorization algebra:  $0) \quad \mathcal{U} = \mathcal{U}_1 \perp \cdots \perp \mathcal{U}_{\kappa}$  $\Rightarrow \mathcal{A}(u_1) \otimes \cdots \otimes \mathcal{A}(u_k) \xrightarrow{\simeq} \mathcal{A}(u)$ 2) Jocality condition:  $(U_i \hookrightarrow U)_{i \in I}$  forms a Weus cover



digression husted functorial field theories
2-category G-Bord:
Obj: Closed d-1 manifolds × [0, E) gluing casy

mor: G-bordisms 2mor: y-diffeo between bordisms

truisted field theories: GBord JE TAIg as in the flist locture  $\perp \qquad \qquad \qquad \qquad \qquad \perp (\lambda)$ 

 $\gamma_{o} \stackrel{\nearrow}{\searrow}_{\gamma_{i}} \longrightarrow T(\gamma_{o}) T(\gamma_{i})$ E(Y) = right T(Y)-module 2-mor intertuiners  $f(\xi) = E(Y_0) \xrightarrow{f(Y_0)} E(Y_1) \underset{T(Y_1)}{\otimes} T(\xi)$ 

E is a T-twisted field theories

Now replace Tolly by dg-Tolly objects: dg categories = categories enriched over dg-Vect-Chain complexes mor: dg modules — An A-B bimodule (s a dg-adegory  $\mathcal{M}$  with  $\mathcal{A}$ ,  $\mathcal{B}$  dg-adegories — ob  $\mathcal{M}=$  ob  $\mathcal{A}\perp\!\!\!\!\perp$  ob  $\mathcal{B}$  —  $\mathcal{A}$ ,  $\mathcal{B}$  are full subcots of  $\mathcal{A}$  —  $\mathcal{M}$  (a,b)=0  $\alpha\in\mathcal{A}$ ,  $\beta\in\mathcal{B}$ 

2mor:  $A^{\mathcal{M}_{B}} \otimes B^{\mathcal{N}_{C}} =: A^{(\mathcal{M} \otimes \mathcal{N})_{C}} =: A^{(\mathcal{M} \otimes \mathcal{N})_{C}} (c,a) :=$ 

ho colim ( M(b,a) & N(c,b) = + M(b,a) & N(c,b) = )

Construction of Ty: GBord -> dgTAlg associated to localisation algebra

A on of-manifolds

To(Y) = [ herond

 $Y_{X} [o, E) \longrightarrow T_{A}(Y) = \begin{cases} beyond \\ combrehension \end{cases}$