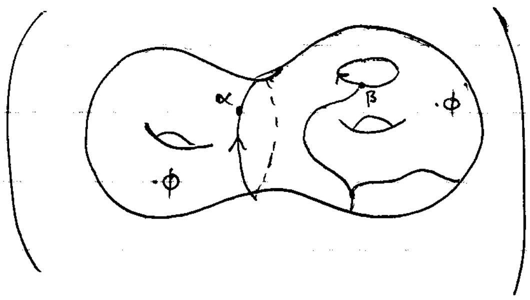
Carqueville (May 7th, 2011, 12:00 – 12:30)

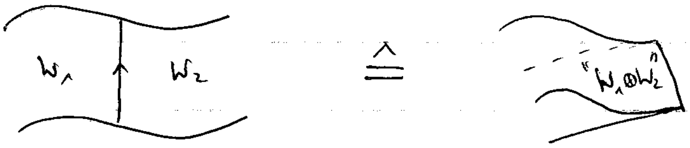
Topological defects in Landau-Ginzburg models (with I. Runkel)

($W \in \mathbb{C}[x_1, \dots, x_N]$ isolated sing.)

Motivation

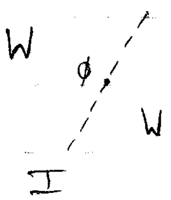
Z 

independent of location of defect lines as long as they don't cross field intersections



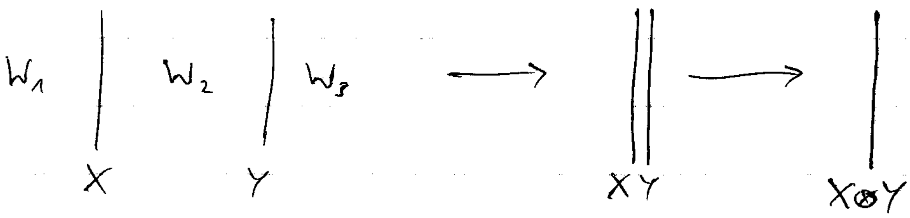
⇝ Defects between W_1 and W_2 described by $MF(W_1 \otimes 1 - 1 \otimes W_2)$

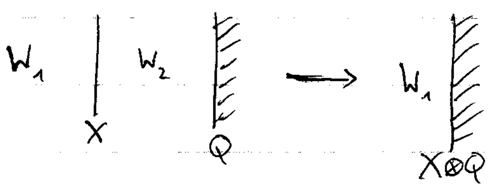
Example invisible defect



$I \in MF(W \otimes 1 - 1 \otimes W)$ corresponds to $\mathrm{Id} \in \mathrm{End}(MF(W))$

$\mathrm{End}(I) = \mathrm{Jac}(W) =$ bulk sector

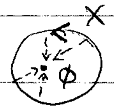


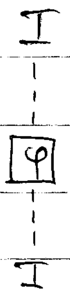
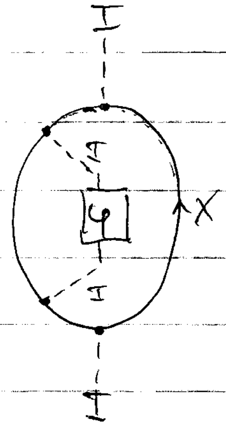
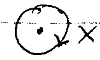


Theorem [C/Runkel] $MF(W \otimes 1 - 1 \otimes W)$ is · monoidal

Remark Part of bicategory [Lazaroiu, Mc Namee]

Action on bulk-fields

$\mathrm{Jac}(W) \ni \phi \cdot \longmapsto$  $= \phi_X$

 $\longmapsto \mathcal{D}_\ell(X)(\varphi) =$  [$\mathcal{D}_r(X)(\varphi) =$ ]

$ev_X : X^\vee \otimes X \to I$, $coev_X : I \to X \otimes X^\vee$.

[N=1]

Theorem [C. / Runkel] $MF(W\otimes 1 - 1 \otimes W)$ is pivotal rigid monoidal

$\exists\ \mathrm{Id} \xrightarrow[\text{hat. Trafo}]{} (\cdot)^{\vee\vee}$ monoidal iso.

composition of maps

$$\mathcal{D}_{\ell/r}(X \otimes Y) = \mathcal{D}_{\ell/r}(Y) \circ \mathcal{D}_{\ell/r}(X)$$

$$\mathcal{D}_\ell(X^\vee) = \mathcal{D}_r(X), \quad \mathcal{D}_{\ell/r}(I) = id$$

Prop $\mathcal{D}_\ell, \mathcal{D}_r$ induce ring (anti-) homomorphisms $K_0(MF(W\otimes 1 - 1\otimes W)) \otimes_{\mathbb{Z}} \mathbb{C}$

$$\twoheadrightarrow \mathrm{End}^\circ(\underbrace{\mathrm{End}(I)}_{= HH(DG(W))})$$