Let $\mathcal{C}$ be traced. We know $\mathsf{Int}(\mathcal{C})$ is the free compact closed category over $\mathcal{C}$, and there is a fully faithful $\mathcal{C} \to \mathsf{Int}(\mathcal{C})$.

Lemma 1. *Let $F : C \to D$ be strong monoidal and fully faithful, then $\mathbf{Optic}(F)$: $\mathbf{Optic}(\mathcal{C}) \to \mathbf{Optic}(\mathcal{D})$ is faithful.*

Proof. Assume $\langle Fl \mid Fr\rangle \sim \langle Fl' \mid Fr'\rangle$, this means

$$\begin{aligned}
&\exists m.(Fl = (m \otimes \mathrm{id}) \circ Fl') \wedge (Fr \circ (m \otimes \mathrm{id}) = Fr') \\
&\quad \text{(by fullness)} \\
&\exists n.(Fl = (Fn \otimes \mathrm{id}) \circ Fl') \wedge (Fr \circ (Fn \otimes \mathrm{id}) = Fr') \\
&\quad \text{(by strong monoidal)} \\
&\exists n.(Fl = F((n \otimes \mathrm{id}) \circ l')) \wedge (F(r \circ (n \otimes \mathrm{id})) = Fr') \\
&\quad \text{(by faithfulness)} \\
&\exists n.(l = (n \otimes \mathrm{id}) \circ l') \wedge (r \circ (n \otimes \mathrm{id}) = r')
\end{aligned}$$

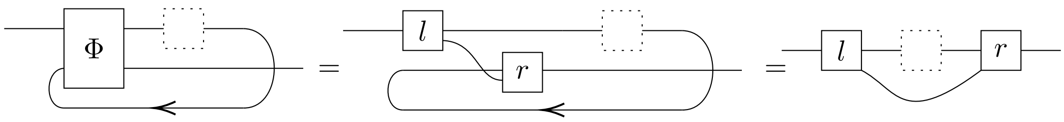
then, $\langle l \mid r\rangle \sim \langle l' \mid r'\rangle$. ☐

Lemma 2. *There is a function $\mathcal{C}(S \otimes B, A \otimes T) \to \mathbf{Optic}(\mathsf{Int}(\mathcal{C}))((S,T),(A,B))$ such that*

$$\mathbf{Optic}(\mathcal{C})((S,T),(A,B)) \to \mathcal{C}(S \otimes B, A \otimes T) \to \mathbf{Optic}(\mathsf{Int}(\mathcal{C}))((S,T),(A,B))$$

is the induced by $C \to Int(C)$.

Proof. We put $\phi \in \mathcal{C}(S \otimes B, A \otimes T)$ on the left side of the optic, and we connect the two B using the compact structure of Int(C). A diagram explains this better.



These equalities are not between optics over $\mathcal{C}$, but optics in the free compact closed category over it. ☐

Finally, putting together the two lemmas, if two optics are the same after embedding in Int, they should be the same in $\mathbf{Optic}(\mathsf{Int}(\mathcal{C}))$ with the function on Lemma 2, and thus (Lemma 1) they should be the same.