

# Examples of relative Trisections

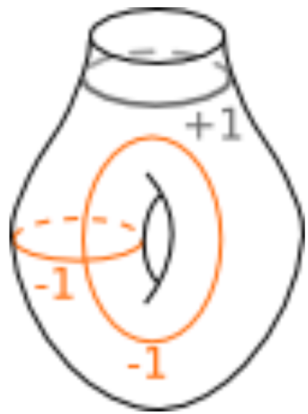
Part A: Fillings of open books

Part B: Pieces in cut-and-paste  
operations

# Fillings of open books

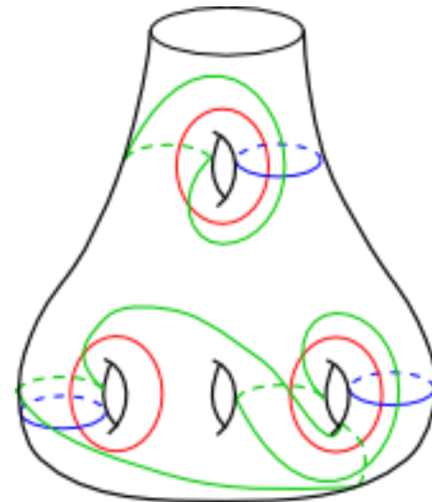
1.  $\mathbb{P}$  as  $-1$  surgery along  $T_{2,-3}$

Surgery on open book of  $S^3$   
given by  $T_{2,-3}$  plumbing



Right-veering monodromy  $\Rightarrow$   
open book supports a **tight**  
contact structure

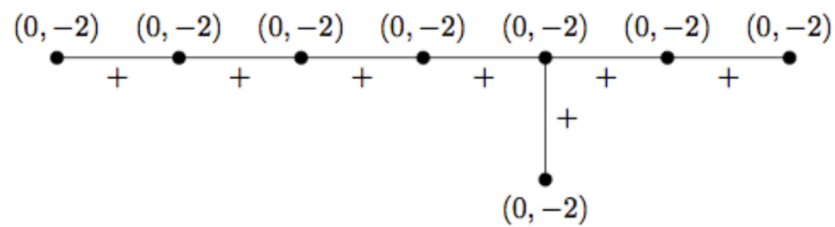
Trisection of  $B^4 \cup 2$ -handle



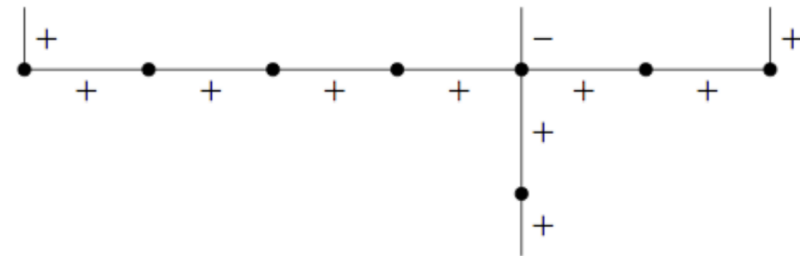
$b_2(B^4 \cup 2\text{-handle}) = 1 < 8 \Rightarrow$   
 $B^4 \cup 2\text{-handle}$  is not homeomorphic  
to  $E_8$  manifold  $\Rightarrow$   
 $B^4 \cup 2\text{-handle}$  is **not Stein**

# Fillings of open books

## 2. $\mathbb{P}$ as boundary of $E_8$ with planar open book

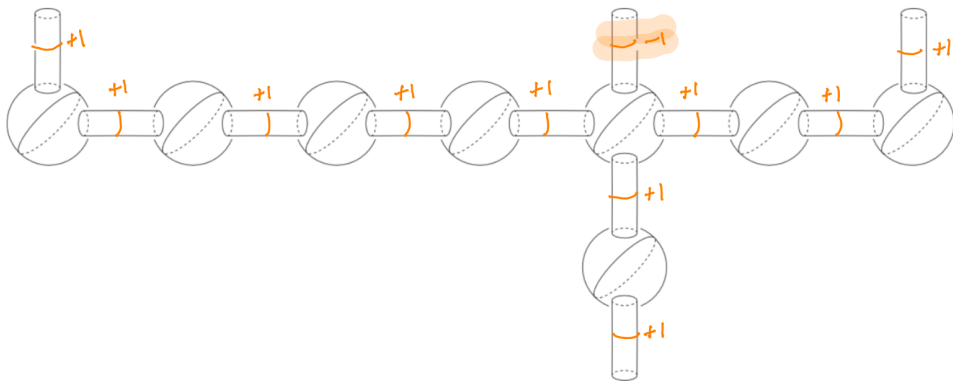


(a) The plumbing graph  $E_8$ .



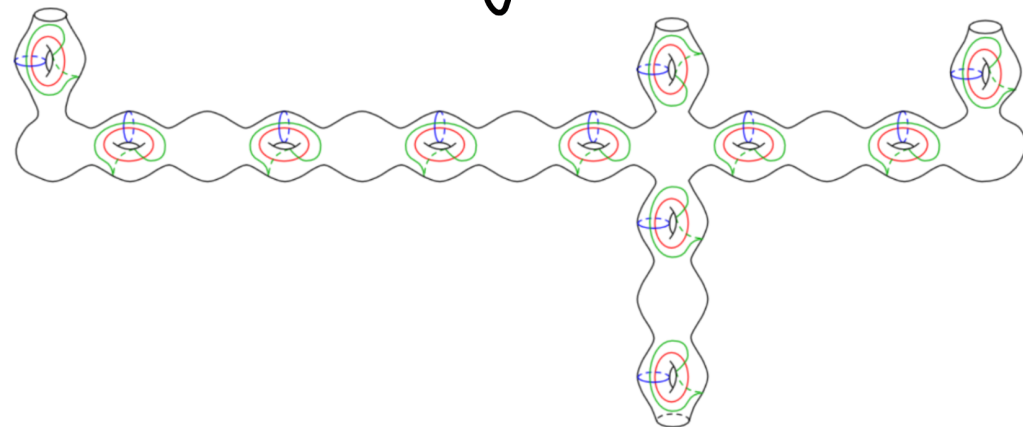
(b) The modified plumbing graph  $E_8^*$

### Planar open book



Monodromy not right-veering  $\Rightarrow$   
contact structure **not tight**

### Trisection diagram

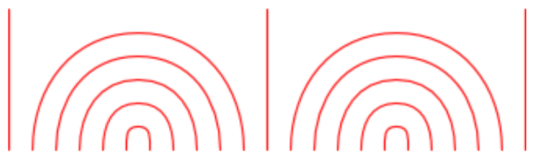
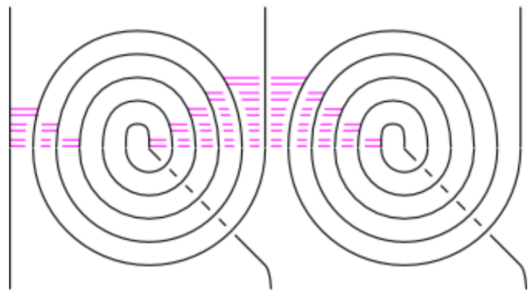


Lefschetz fibration not positive  
 $\Rightarrow$  **not Stein structure**

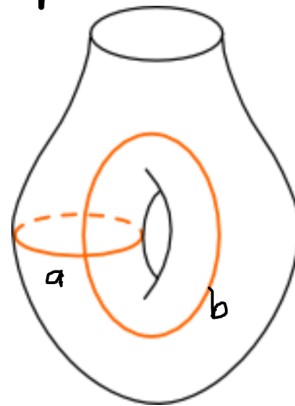
# Fillings of open books

3.  $P$  as 2-fold cover of  $S^3$  branched over  $T_{3,5}$

Braided surface

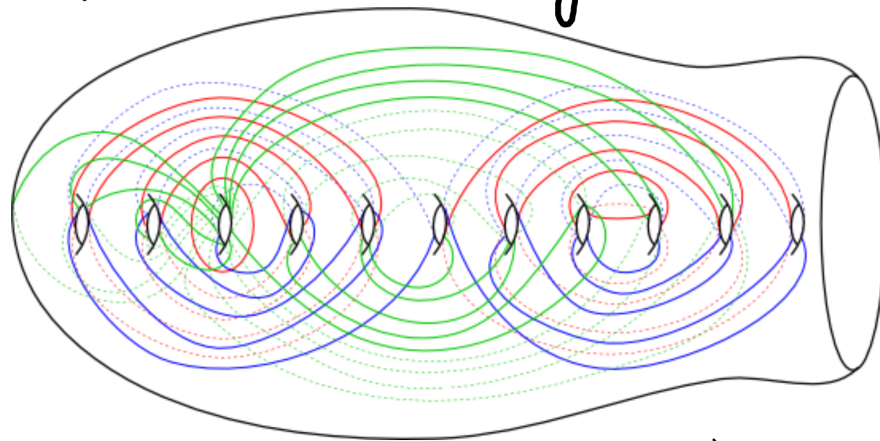


Open book



Monodromy is  $(\tau_a \tau_b)^5$   
 $\Rightarrow$  positive  
 $\Rightarrow$  tight

Trisection diagram



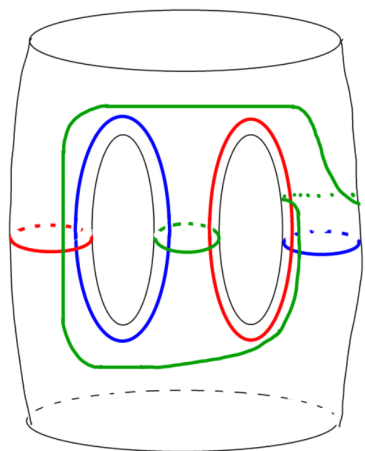
Branched cover over positive surface  
 $\Rightarrow$  Stein

# Pieces of constructions of exotica

## 1. Gluck twists

$$X = X \setminus N(S^2) \cup S^2 \times D^2$$

$$X' = X \setminus N(S^2) \cup_{\mathbb{Q}} S^2 \times D^2$$

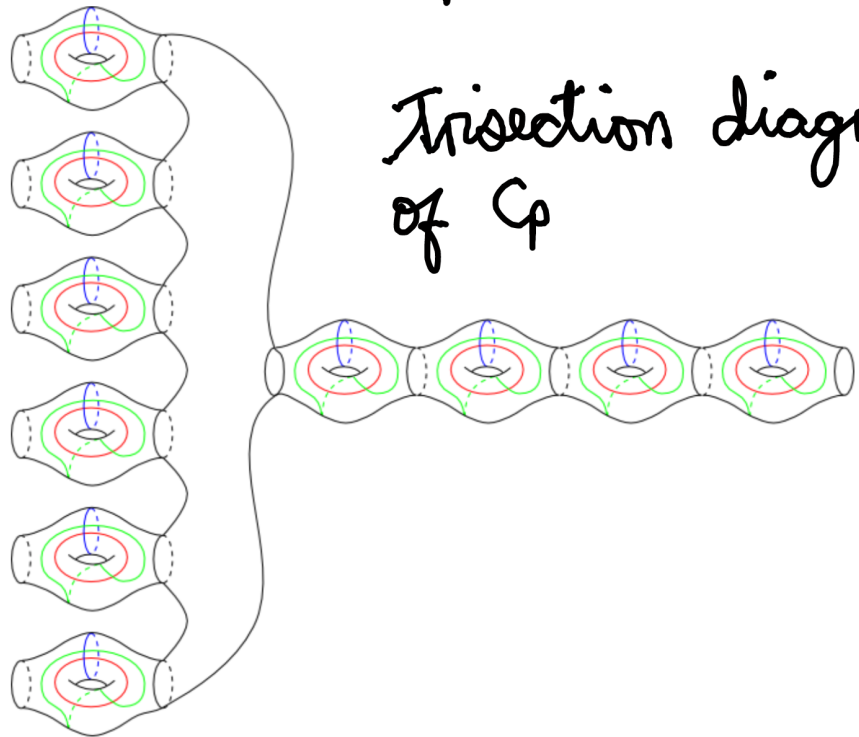


Trisection diagram for a  $D^2$  bundle over  $S^2$ .

## 2. Rational blowdown

$$X = X \setminus C_p \cup C_p \quad \leftarrow \text{plumbing}$$

$$X' = X \setminus C_p \cup B_p \quad \leftarrow \begin{array}{l} \text{rational homology} \\ \text{4-ball} \end{array}$$



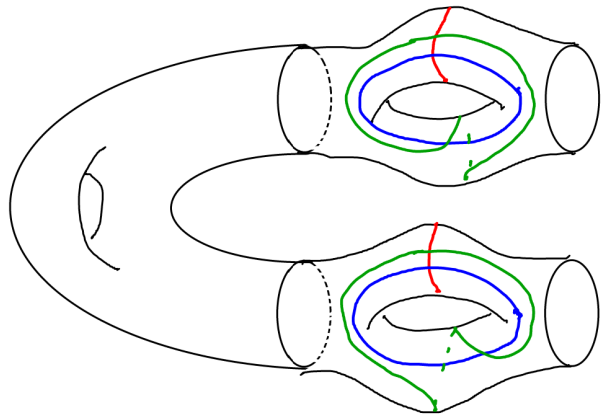
Trisection diagram of  $C_p$

# Pieces of constructions of exotica

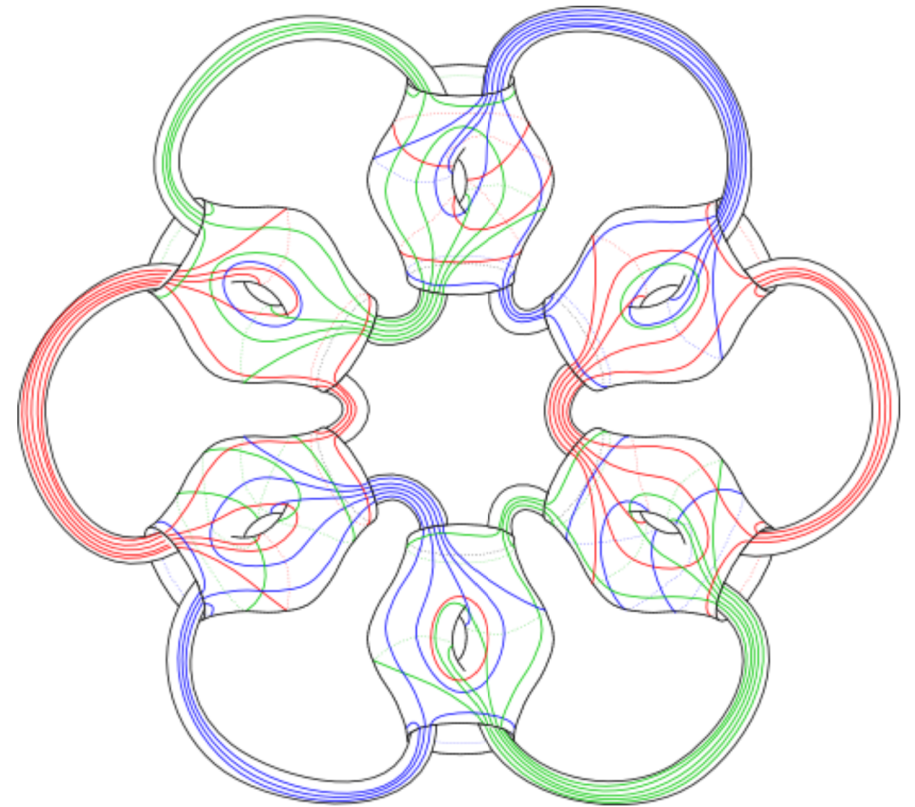
## 3. Fintushel-Stern knot surgery

$$X = X \setminus N(T^2) \cup T^2 \times D^2$$

$$X' = X \setminus N(T^2) \cup S^1 \times S^3 \setminus N(K)$$



Trisection diagram of  
 $S^1 \times S^1 \times D^2$



Trisection diagram of  
 $S^1 \times S^3 \setminus N(K)$

# Finding the monodromy of the OB

