

## The Bracket Polynomial and Surfaces

- Fix a representation of a knot diagram. Let  $F$  denote the surface and let  $K$  denote the immersion of the knot diagram in  $F$ .
- The surface  $F$  is a closed, orientable 2-dimensional surface. Hence,  $F$  is the connected sum of tori.
- Expand each classical crossing into a type  $\alpha$  smoothing and a type  $\beta$  smoothing to obtain a collection of states in the surface. Each state consists of a collection of simple closed curve in the surface  $F$ .
- If  $C$  is a cancellation curve for  $F$  and  $K$ , then  $C$  does not intersect any of the states obtained from  $K$  in the surface  $F$ .
- If for each torus component there exists two states with curves,  $\gamma = \phi$ , with homology classes that intersect non-trivially then there is no cancellation curve in that component.

