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Topological defects in lattice models and affine Temperley–Lieb algebra

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In conformal field theory topological defects, can be seen as boundaries joining two sectors of a CFT in such a way that the partition function is invariant under any continuous deformation of this boundary. From an algebraic point of view, these can be realised as operators that commute with the action of the Virasoro algebra, and can be used to encode the fusion rules of the theory. On the lattice there has been many attempts at defining such objects, in particular through various types of integrable boundary conditions (Chui et al, arxiv:hep-th/0106182). However, their construction was limited to the RSOS models on a torus; we developed an extension of their construction to any model built out of the affine Temperley-Lieb algebra $\mathtt{aTL}_n$.

I will present our construction of topological defects in $\mathtt{aTL}_n$ and explain how they can be used to define hybrid fusion functors on the lattice. I will discuss in particular their implementation in the twisted XXZ spin chain, and how the boundary conditions they create produces Hamiltonians with Jordan blocks even at q generic.

From a purely algebraic point of view, I will also explain how these defects generate the known central elements of the algebra and how these new fusion functors relate to those that are already known.

Based on joint work with A.M. Gainutdinov, J.L. Jacobsen, H. Saleur, and T. Silva.

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