



**Universiteit
Leiden**
The Netherlands

On cluster algebras and topological string theory

Semenyakin, M.

Citation

Semenyakin, M. (2022, September 15). *On cluster algebras and topological string theory*. *Casimir PhD Series*. Retrieved from <https://hdl.handle.net/1887/3458562>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3458562>

Note: To cite this publication please use the final published version (if applicable).

Stellingen

behorende bij het proefschrift

On cluster algebras and topological string theory

1. The XXZ spin chain is isomorphic to a cluster integrable system of rectangular Newton polygons [chapter 2].
2. The solution of the tetrahedron equation by Bazhanov and Sergeev has a cluster-algebraic origin. This observation greatly generalizes the class of integrable systems that can be constructed using this solution [chapter 3].
3. The counting of three-dimensional boxes by dimers on a hexagonal lattice can be generalized to general bipartite graphs [chapter 4].
4. The viscosity of electrons in graphene can be measured in AC electrical conduction [chapter 5].
5. Two-dimensional viscous flows of strongly interacting electrons in a channel create vortices. Depending on the boundary conditions, there appears either a vortex pair or an infinite vortex train.
6. The claim by Putzke *et al.* [Science **368**, 1234 (2020)] that the phase coherence length in their magnetoconductance experiment exceeds $10 \mu\text{m}$ is not supported by a semiclassical interpretation of their data.
7. Majorana zero-modes do not respond to electric or magnetic force fields, but they can be manipulated by means of the Magnus force.
8. Tangent fermions, massless fermions on a space-time lattice with a dispersion relation $\tan^2(E/2) = \sum_{\alpha} \tan(k_{\alpha}/2)$ in dimensionless units, solve all but one of the problems inherent with the discretization of the Dirac equation.

Mykola Semenyakin

15 september 2022