1172-57-198   **Jozef H. Przytycki*** (`przytyck@gwu.edu`), George Washington Universuty, Phillips Hall, Washington, DC 20052-0001, and **Marithania Silvero** (`marithania@us.es`), , Spain. *Computational complexity of finding geometric realization of Khovanov homology.*

The talk dedicated to memory of Zbyszek Oziewicz.

Computing Khovanov homology of links is NP-hard. Thus finding homotopy type of its geometric realization is also NP-hard. We conjecture that for braid diagrams of fixed number of strings finding homotopy type of geometric realization (and its homology) has polynomial time complexity with respect to the number of crossings. The conjecture is wild open but its solution would have big impact on understanding of Khovanov homology.

As a step toward a solution of the conjecture we prove the following result:

Theorem: The homotopy type of geometric realization of extreme Khovanov homology of 4-braid diagrams has polynomial time complexity and the topological complexity is at most one. Furthermore the geometric realization is either contractible, or homotopy equivalent to a sphere, or to a wedge of two spheres. (Received August 27, 2021)