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Instanton Floer homology of (1,1)-knot.

Instanton knot homology was first introduced by Floer around 1990 and was revisited by Kronheimer and Mrowka around 2010. It is built based on the solution to a set of partial differential equations and is very difficult to compute. On the other hand, Heegaard diagrams are classical tools to describe knots and 3-manifolds combinatorially and are also the basis of Heegaard Floer homology, which was introduced by Ozsváth and Szabó around 2004. In this talk, I will explain how to extract some information about the instanton theory from Heegaard diagrams. In particular, we study the (1,1)-knots, which are known to have simple Heegaard diagrams. We provide an upper bound for the dimension of instanton knot homology for all (1,1)-knots. Also, we prove that, for some families of (1,1)-knots, including all torus knots, the upper bound we obtained is actually sharp. This is a joint work with Fan Ye. (Received September 11, 2020)