

Towards arithmetic Floer cohomology

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Abouzaid and Manolescu have constructed sheaf theoretic analogues of $SL(2, \mathbb{C})$ Floer cohomology for 3-manifolds. Their work uses the delicate chain of logic that Lagrangian intersections are -1 -shifted symplectic, which are d -critical loci, which in turn carry a natural perverse sheaf of vanishing cycles. Taking the hypercohomology of this perverse sheaf yields an invariant of the underlying 3-manifold. In this talk we will discuss how one might use similar techniques to define a Floer cohomology theory on the Lagrangian intersections appearing in Minhyong Kim's arithmetic gauge theory program, such as Selmer groups of elliptic curves and fiber products of pro-unipotent principal bundles on arithmetic schemes. We will also discuss how this tool might offer deeper insights into the nature of arithmetic Casson invariants and the Fontaine-Mazur conjecture.