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Homological mirror symmetry is Fourier-Mukai transform.

We interpret symplectic geometry as certain sheaf theory by constructing a sheaf of curved A_∞ algebras which in some sense plays the role of a “structure sheaf” for symplectic manifolds. An interesting feature of this “structure sheaf” is that the symplectic form itself is part of its curvature term. Using this interpretation homological mirror symmetry can be understood by well-known duality theories in mathematics: Koszul duality or Fourier-Mukai transform. In this paper we perform the above constructions over a small open subset inside the smooth locus of a Lagrangian torus fibration. In a subsequent work we shall use the language of derived geometry to obtain a global theory over the whole smooth locus. However we do not know how to extend this construction to the singular locus. As an application of the local theory we prove a version of homological mirror symmetry between a toric symplectic manifold and its Landau-Ginzburg mirror. (Received February 02, 2012)