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Title: Microlocal brane structures and the classifying map

Abstract: For any Lagrangian L in the cotangent bundle of a manifold X , one can define a sheaf of stable infinity-categories on L using microlocal sheaf theory over ring spectra. When L is smooth, the sheaf of categories is a local system with fiber equivalent to the infinity-category of spectra, and we call it the sheaf of brane structures on L . The sheaf of brane structures naturally admits a classifying map. We show that the classifying map is homotopic to the composition of the stable Gauss map and the delooping of the J -homomorphism in stable homotopy theory. The main ingredients include a sheaf quantization of a Hamiltonian $\mathrm{BO}(n)$ -action on the stable cotangent bundle of \mathbb{R}^N that is naturally related to Bott periodicity, and the theory of correspondences developed by Gaitsgory–Rozenblyum.